

# RAILROAD GAZETTE

FRIDAY, NOV. 3, 1893.

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## Contributions.

## Car Coupler Drop Tests.

TO THE EDITOR OF THE RAILROAD GAZETTE:

While it is acknowledged that the pulling test to which couplers were submitted by the M. C. B. Committee on Tests, some few months ago, has been of practical benefit both to the railroads and the coupler men, there is considerable doubt as to the value of the drop test; the reason being that this test in no way represents the conditions of actual service.

It has occurred to the writer that a series of tests might be devised that would not only materially aid the makers, but be of some practical benefit to buyers in selecting a coupler from the many submitted for their inspection. The accompanying drawing gives my ideas as to the construction of a drop, and needs no explanation.

The result of any test of guard arm made under an ordinary drop would be of no value to coupler men, in view of the fact that there is so much doubt as to the exact cause of the fracture at this point. Now, on the other hand, the above proposed test would determine for a certainty whether this fracture is caused by the impact or not, and the cause once determined a remedy would soon be found.

The same might be said as to each of the weak points developed under the late drop test.

S. T. SMITH.

## The Law of Copyright, and Some Incidental Observations.

NEW YORK, Oct. 24, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

With interest and profit I have just read your editorial in the *Railroad Gazette* of 20th instant, entitled "For the Doctors in Ethics," but regarding some of the opinions which you have therein advanced I take issue.

Thus, you say respecting the status of the copyright: "Legally, in the present instance, the Society or Mr. Crowell probably has no standing whatever." If not, to whom has the right and title passed? If there is "no standing whatever," legally; if the presumed property of the Society is not property but is simply material upon which your "careful" and thrifty editor may turn an honest penny by the simple use of paste-pot and the addition of paper covers, why then is it even "a matter of manners and morals?"

I do not wonder that you disclaim being an ethical "code-maker" for an organization presumably made up of gentlemen. I can well imagine your embarrassment in such a rôle as you pondered over the time in life at which the code should take effect, or whether to derive the best results, the influence had better be ante natal. So I am glad that you disclaim the drawing of a code of gentlemanly rules for the guidance of gentlemen.

But let us see if the Society has "no standing." It publishes a monthly magazine entitled the *Transactions*; this is subscribed for by the Society's members; it is transmitted through the mails as second class matter; its articles are voluntary contributions from the members; the Society is taxed for its editorship; and for paper, press work, engraving and postage a very con-

siderable amount is regularly paid out under the control and scrutiny of Board of Directors, and all for the purpose of circulating these magazines. Moreover, business firms not connected with the Society pay the Society for advertising space therein, thus establishing the value of its circulation.

Again, the Society regularly prints and binds a considerable number of extra or reserve copies; thereby investing its capital that its members and others may be able to obtain back copies at any time of any issue, and in this connection I beg to submit, upon information just received from Mr. Collingwood, Secretary of the Society:

First—That the Society has now in its possession about 200 extra copies of the *Transactions* containing Mr. Crowell's paper; that the price per copy is \$1.

Second—That it also has about 90 reserve copies of the paper separate from the *Transactions*, the list price being 25 cents per copy and the net price to members 15 cents. Now call the cost to the Society, for the pamphlets 10 cents and the *Transactions* 50 cents each, a low estimate. Thus it will be seen that the American Society of Civil Engineers has an actual investment under its copyright for the express purpose of being in position to accommodate its members and the public and, incidentally, to derive a profit from Mr. Crowell's contribution.

And where does the Society now stand in the matter? Is it not in direct competition with certain of its members and that, too, by no act of its own? If you but admit this, then let me join hands with you on the general principles herein involved, and in which your practice of ethics more than offsets your shortcomings as an exponent of the law in equity.

The policy of the Society is well known to be on the side of liberality as respects the use of its publications. But because the Society, with a proper spirit, has permitted free extraction, thereby giving a benefit to publishers and deriving a benefit in return by increased publicity, it is not seen wherein this "vitiated" its rights under its copyright. For instance, let us suppose that the publisher, Mr. Wiley, sends to an editor a copyrighted book of 100 pages; that it is reviewed; that 80 pages are regarded as a sufficient excerpt, with "careful" editing, to present to the editor's clientele; that thereafter the said 80 pages, and perhaps a few more, are printed in another book; that the whole, including the title page, is again copyrighted and again offered for sale. Would the original publisher have no "standing"? Well, I think Mr. Wiley would say he had. It's all in the difference of the size of the owner of the bull. "Who owns the bull," said the little fellow with rising wrath, whose plot had been trespassed. "I do, you beggar," said the six-foot grenadier. "Well, well, my honest soldier," with great deference, "but he's a bonnie beast."

The pith and core of the whole matter is, that the well prepared matter of the *Transactions* is often most desirable material for the pages of their publications. The reasons for this are obvious, and have heretofore been amplified.

Again, I observe that you state, as a matter of belief, that Mr. Crowell, the author of the pirated paper, "has no personal grievance," and, knowing the gentleman as I do, I fully concur with you in so far as saying that he, beyond doubt, looks upon the entire matter with such a degree of self-abnegation as would command the admiration of the canopial code-makers. Silence to them is golden. There have been cases, however, in which even the Holy Fathers have applauded the "warming of a jacket." In an editorial in the *Evening Post* of the 23d instant, dealing with the international copyright question and the case of Brandeis, the Danish critic, the circumstances being quite similar to those of Mr. Crowell's case, that stalwart Mugwump closes in these words: "This is not only robbing a man, but maltreating him into the bargain."

But I digress from the law in equity, "for every wrong a remedy"; has Mr. Crowell no legal standing? I beg to submit that he has; that his case would properly be directed against the Society which assumed the guardianship of his paper and which would permit the rape you have described to pass without taking the action well within its scope and province. But would such action be desirable on the part of the Society or Mr. Crowell? "Would the game be worth the candle?" In my candid opinion it would not; for your thrusts into the windbag of ethics, as she is sometimes practiced, even under a beautiful canopy, ought either to result in a happy collapse, or else our game in the light of your candle will be like unto the observation of Don Quixote's Esquire: "Why, look you, sir, the higher the monkey climbs the more it exposes its bare haunches."

But all this as it may, however, I am, as heretofore, distinctly of the opinion that our *Transactions*, a publication second to none of its kind in scope, volume and quality, is circulated, first, for the benefit of the members of the Society, and, secondly, for mankind (including editors) in general. Whence it does not necessarily follow that what may be had for the asking is therefore free to be taken.

JOHN THOMSON, M. Am. Soc. C. E.

[We have taken no legal opinion in this matter, not being interested in seeing precisely how close one can sail to the copyright law; but it is well known that if a manuscript is published by an author or with his con-

sent, without first protecting it by copyright, it becomes public property, and any person who chooses to do so has the right to republish it. Contributions to the *Transactions* by members are printed and distributed by the Society to its members and the technical press before any copyright has been obtained, with the knowledge and implied consent of the authors. In fact the Society, by action of the Society and of the Board, permits and invites practically unlimited publication of its papers in advance of their publication in the copyrighted *Transactions* and without any notice that the matter is copyrighted or to be copyrighted by the Society. The whole question must hinge upon this point, viz.: whether a manuscript being printed by a society and distributed to its members and to certain papers with the privilege of publication, and being then published in one or more of those papers without notice of copyright, does not become public property. We think it does, and we suspect that the society would find it difficult to get damages in court for such appropriation of its papers to the commercial uses of other publishers as has been made in the case described by us. That is, if we are right in this suspicion the copyright has been vitiated. Mr. Wiley is reputed not to have been born yesterday, and he probably knows about how far it is politic to let reviewers and publishers go in reprinting his material—but we suggest that the analogy is not good. In the case imagined by Mr. Thomson the first publication will have been made under Wiley's copyright. In the case of the American Society of Civil Engineers the first publication has been made without notice that the matter is copyrighted.—EDITOR RAILROAD GAZETTE.]

## The Improvement of the Columbia River.

We have received the report of a special board of engineers appointed by order of the War Department to re-examine the matter of the obstructions to navigation in the Columbia River from the navigable waters below Three Mile Rapids to the navigation above the Celilo Falls. There appeared in the *Railroad Gazette* of June 24, 1892, a discussion of the ship railroad project which was put forward by officers of the corps of engineers, together with a statement of the difficulties to be overcome. That discussion was chiefly a communication from Mr. John F. O'Rourke to the Chairman of the River and Harbor Committee of the House of Representatives, and showed the impracticability of the ship railroad project so far as it had then been developed.

The effort to get Congressional authority to go on with this work was soon after defeated and a board of engineers was appointed to re-examine the whole subject. This board consisted of Colonel G. H. Mendell, Lieutenant-Colonel C. R. Suter, Lieutenant-Colonel W. R. King and Major C. J. Allen, Corps of Engineers, U. S. A., and William R. Hutton, Gen. E. P. Alexander and Virgil G. Bogue, civil engineers.

About a year ago the members of this Board went to Oregon and made a study of the conditions, and last April presented the report which is now printed by order of the Senate.

The navigation of the Columbia is first interrupted by the Cascades, 63 miles from Portland and 160 miles from the river's mouth. The United States Government is now building a short canal there with locks which will provide for all requirements of navigation; meantime, a portage railroad five-eighths of a mile long transfers passengers and freight. From the Cascades to Dalles City, 53 miles by the river, navigation is again good, but near Dalles City begin the obstructions which the Board was directed to consider. In a length of 12 miles there are the Three Mile Rapids, the Five Mile Rapids, The Dalles, the Ten Mile Rapids and finally the Celilo Falls. In this twelve miles of river the total fall is 80 ft. in low water and 60 ft. in high water. The Three Mile Rapids is a crooked channel 1,500 ft. long, narrow and much obstructed by rocks and currents. The Dalles are a mile and a half long in a cañon, the basalt walls of which are from 150 to 300 ft. apart. In high water this great contraction of the river bed acts as a dam, drowning out the rapids and falls above the level of the river at Celilo. The Ten Mile Rapids is a similar gorge half a mile long and the Celilo is a sheer fall of 20 ft.

From Celilo to Wallula, 115 miles by the river, fairly good navigation exists; then there is 10 miles of shallow navigation to the mouth of the Snake River. From the mouth of the Snake to Priest's Rapids there is again good water, but there rapids 10 miles long with a fall of 70 ft. will form the head of that navigation on the Columbia which depends on The Dalles improvement. On the Snake River there is 53 miles not navigable in low water, then 77 miles navigable for light draft steamers at all times. Seventy miles more of navigation can be added on the Snake and the Clearwater during good stages of water.

The short portage railroads at the Cascades and The Dalles went out of use when the Oregon Railway Navigation Co., about 1880, acquired the property of the Oregon Steam Navigation Co. In 1890 a portage railroad at Cascades was built by the state, a grant of \$60,000 having been obtained for that purpose. The report be-

fore us gives no satisfactory figures as to the business ever done by the Oregon Steam Navigation Co. with its portage railroads. In 1872 it carried 18,000 tons of freight, and in 1877 the passenger and freight business is said to have been largely in excess of what was carried the year before. This apparently is all the information that the reports of that company give for the purposes of the Board.

The demand for the open navigation of the Columbia River comes from the wheat growing districts east of the Cascade range. An improvement of the lower section of the Snake and of The Dalles as proposed would open 200 miles of navigation from the heart of the wheat lands to the sea. The wheat crop of eastern Oregon and Washington probably exceeds 400,000 tons, and the report tells us that in 1890 the railroads were not able to transfer it within a reasonable time. The wheat and other cereals received at Portland from the country east of the obstructions in 1891 was nearly 8 million bushels, and the board estimates that in 1891 about 15 million bushels of wheat was shipped to the Pacific Coast from the country which would be more or less affected by the removal of the obstructions at The Dalles. The United States report on internal commerce for 1890 estimates that the lands tributary to Tacoma and Portland were capable of producing 2 million tons of wheat a year.

It is said that the effects of water competition which has been rendered possible by the construction of the state portage railroad at the Cascades has been to reduce rail rates on general merchandise from 67 cents a hundred to 37, and that the reduction on water rates has been still greater.

The possible means of overcoming the obstructions at Celilo and The Dalles are (1) a portage railroad or (2) a boat railroad with hydraulic lift, or (3) a canal.

The portage railroad would be comparatively inexpensive, quickly built and would give immediate relief, but it involves transhipment at each end. Its capacity with hand labor, and one incline at each end, is 1,600 tons a day, which can be doubled by duplication of the inclines or increased by the use of machinery.

A boat railroad is considered feasible, with a curvature not to exceed 1 deg. (radius 5,730 ft.), but it would be experimental and would have certain disadvantages as compared with a canal. The railroad and cars projected would pass flat bottom boats, weighing with cargo up to 600 tons, 108 ft. long by 38 ft. beam. The maximum capacity with the estimated equipment, two cars and four locomotives, is 16 boats each way in 24 hours. By spending from half to three-quarters of a million dollars for more equipment, the maximum capacity might be 40 boats a day each way.

From previous estimates upon partial canals and from other information, the Board had concluded that a continuous canal was inadmissible by reason of its great cost, and therefore did not think it wise to spend any of the small fund at its disposal on canal surveys. The Board, however, prepared estimates of the cost of the canal from such data as were available from former surveys and other sources. The majority is of the opinion that a canal to pass boats of the dimensions for which the boat railroad provides will not greatly exceed four million dollars in cost, which is considerably in excess of the estimated cost of the boat railroad, but the canal would be cheaper to operate, would have greater capacity and impose fewer limitations on the character and condition of the boats. It would be 100 ft. wide at the bottom, 6 ft. deep, about  $\frac{3}{4}$  miles long, and the termini the same as those of the proposed boat railroad at Celilo and Big Eddy. The lift at Celilo at low water would be 20 ft. At Big Eddy the lift above low water would be 72 ft., suggesting a hydraulic lift. Between the terminal locks would be two others with lifts of 15 ft., or with a greater expenditure of water, time and attendance a flight of locks might take the place of the lift at the Big Eddy.

It seems expedient to the Board to consider the location of the portage railroad on the south or Oregon side only of the river. A portage railroad could be built for a little less than \$700,000, something more than \$400,000 of which would be available later for a boat railroad if such should be built. The ultimate cost of the portage road and boat railroad would be \$2,517,000. The cost of the boat railroad alone would be \$2,264,000, including \$170,000 for the improvement of the channel at Three Mile Rapids. Another estimate for a portage railroad is \$454,000.

The Board considered it impossible to forecast the development of navigation above these obstructions should they be removed and it is of the opinion that a portage railroad would be sufficient for present needs and would give an impetus to such development as might eventually lead to more capacious improvements. When the necessity comes for greater accommodation, then a canal may be built. The Board is very guarded, indeed, as to the utility of the portage railroad, or the canal either for that matter, except as a regulator of rates.

There are two members of the Board who present minority reports. Colonel Mendell recommends a boat railroad, but that the portage railroad should first be built and so aligned and constructed as to be a component part of the boat railroad. He refers to the plans of Lieutenant Burr, which, while nowhere used, he says, are feasible; and a road so built and operated would be sufficient for the anticipated needs of commerce.

As to the mechanical and engineering features of Mr.

General Alexander, in a minority report, dissents from the conclusion of the Board as to the feasibility of the high level canal. The peculiar conditions of the situation are found in the basaltic cliffs, full of seams and fissures, in the "heavily and everlastingly drifting sands" which at times would come in fast enough to fill the canal in one day, and could only be removed by dredges and lighters, and in the violent winds from the Pacific which almost incessantly sweep through the gap in the mountain wall. He is unwilling to recommend an indefinite postponement of the extension of unbroken transportation by boat to the large territory and increasing commerce to be benefited by it. He further points out that the right of way, which could now be secured for a small sum, will surely become very much more costly as railroad tracks, salmon fisheries and other improvements occupy the banks. General Alexander recommends, therefore, that the work be so organized at once as to develop into the building of a boat railroad, but that the present work be confined to a portage railroad to be ultimately a part of the boat railroad.

The surveys and estimates of the various lines were made by Mr. Bogue, who located two lines for boat railroads, one on each side of the river. These are described in a brief note. In an appendix is a description of Mr. Burr's proposed boat railroad and rolling stock.

#### Terminals of the Norfolk & Western at Columbus, O.

The original entrance of the Norfolk & Western Railroad, Scioto Valley Division, into Columbus, was over its own line as far as Reed avenue (A, fig. 1); thence on the crowded tracks of the Pittsburgh, Cincinnati, Chicago & St. Louis for a distance of  $2\frac{1}{2}$  miles to the Union Passenger Station. Its freight business was handled over the same route, but was distributed in the yard and freighthouse of the Cleveland, Cincinnati, Chicago & St. Louis. It now has excellent accommodations, the recent completion of the Columbus Connecting & Terminal Railroad providing the best possible terminal facilities. A large amount of very valuable property was purchased for this purpose. The plans were completed in 1892, construction was undertaken during the latter half of that year, and the yards were put in operation June 1, 1893.

The Terminal line begins at Atcheson street (B), near the present terminus of the Norfolk & Western, and extends to the corner of Fifth street and Mount Vernon avenue (9), located at about the center of Columbus, and within a few blocks of the Union Passenger Station, to which also a good entrance is secured by the track marked 7, connecting with the P., C., C. & St. L. The line may be traced on the map, fig. 1, by the figures 1, 2, 4, 5, 6, 8, 9.

The Terminal road makes direct connections with the Pittsburgh, Cincinnati, Chicago & St. Louis, the Baltimore & Ohio, the Columbus, Shawnee & Hocking, the Cleveland, Akron & Columbus, the Sandusky & Columbus Short Line and the Cleveland, Cincinnati, Chicago & St. Louis, and through these roads a good connection is obtained with every railroad entering Columbus. The Terminal property includes a large terminal yard ("outer yard," fig. 1), laid out so as to secure the prompt handling of business at a low cost, and a warehouse yard (9), arranged for the convenient handling of local business, and the transfer of freight from one car to another.

The P., C. C. & St. L. and the B. & O. are crossed at grade between B and 1. The C., A. & C. is crossed at grade at the western end of the outer yard. At St. Clair avenue (5) the freight track diverges from the passenger. The passenger traffic is carried on a track parallel with and upon the same grade as the C., A. & C. to a point just west of Cleveland avenue (6); from this point to the junction of the tracks of the P., C. C. & St. L., the B. & O. the C., C. & St. L. and the C., A. & C., the track of the Terminal is used jointly with that of the C., A. & C. as a double track railroad. The junction of all these tracks is within a few hundred feet of the Union Station, which is entered over the tracks of the P., C. C. & St. L.

The freight track leaves the passenger track at St. Clair avenue (5), turning to the right, but is parallel to it on a higher grade for a short distance. At Cleveland avenue (6) it crosses above the passenger track and the other three roads (the C., A. & C., the B. & O. and the P. C., C. & St. L.) and then descends into the warehouse yard (8, 9), which covers the territory between Mount

Vernon avenue, Fifth street and Neil street, and is directly adjacent to the yard of the P., C. C. & St. L. This yard, with the territory north of it as far as the point marked 6 in fig. 1, is shown in fig. 3. The warehouse at present in use is a temporary one. That designed for the place is to be located on Fifth street ("Freight Station," fig. 3) and will be 96 ft.  $\times$  345 ft.

The outer yard, fig. 2, is arranged so as to take advantage of gravity in its operation. The western portion is the receiving yard, both for freight from the east an

Burr's project, the reader is referred to the article in the *Railroad Gazette* spoken of at the beginning of this abstract.



**The Continuously-Supported Rails in the Osnabrück Track Museum.**

BY CHARLES PAYNE, C. E.

The engineer who may examine the instructive historical exhibits of permanent way at the World's Fair, if he has been engaged in the maintenance of way department of an American railroad, will be surprised by the uniformly excellent endurance of all the specimens of track in which the rails were supported on longitudinal sleepers, when compared with the wear shown by the rails which have been laid upon cross-ties, and he will also wonder that the longitudinally supported track has been known to him only as a theory, except through the original progenitor of the system familiar to us as the strap-rail. If he can spare the time for it, he will go very carefully over all the examples in the collection from the museum of the Georgs-Marien-Bergwerks, and he will thereby be convinced that there is something more in the longitudinal system of tracklaying than he had previously supposed; for he will discover that it is in actual use in a very enlightened portion of the world, and advocated by the skilled engineers who gather-

formed the dreaded "snake heads," common in the early days of American railroading. The ends of the plates being cut at an angle, were pointed, so that they would pierce a car or its occupant if aimed in the right direction.

In England, the Great Western Railway (7 ft. gauge) began in 1834 the use of a bridge rail, or inverted  $\Omega$  rail,

laid upon longitudinals of timber, resting upon cross-ties in the ballast (fig. 1), and continued the system, with slight modifications, until last year. The vices of this system were a too great depth of structure and a low rail of bad form, which crushed into the timber, yet the

for smoothness and

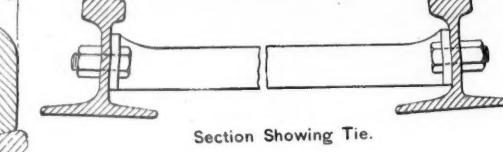
years. It is really the sandwich rail in iron. A similar construction of T-rail between two continuous angle-bars, laid down in Germany in 1860, is exhibited; after having been worked during 16 years it gives a very favorable impression of this system. Hartwich, in 1865, adopted a steel flange rail with a deep web, without sleepers. An example of this system is shown which was laid in Prussia in the year 1868, and was in use for four years in main track, and afterward during 13 years in secondary track.

The next example, historically, is of steel flange-rails in double-trough longitudinals of iron, with cross-ties beneath the joints (the Hilf system), laid in 1876, in Prussia, worked eight years; then a specimen of steel rail, with combined trapezian sleepers, without fastenings, worked during six years in Holland; these three examples all show excellent endurance. In all of these systems except that of Hilf the rails were laid breaking joints with the sleepers, but do not appear to have been fished, except the rails of Barlow and Hartwich, which were without sleepers.

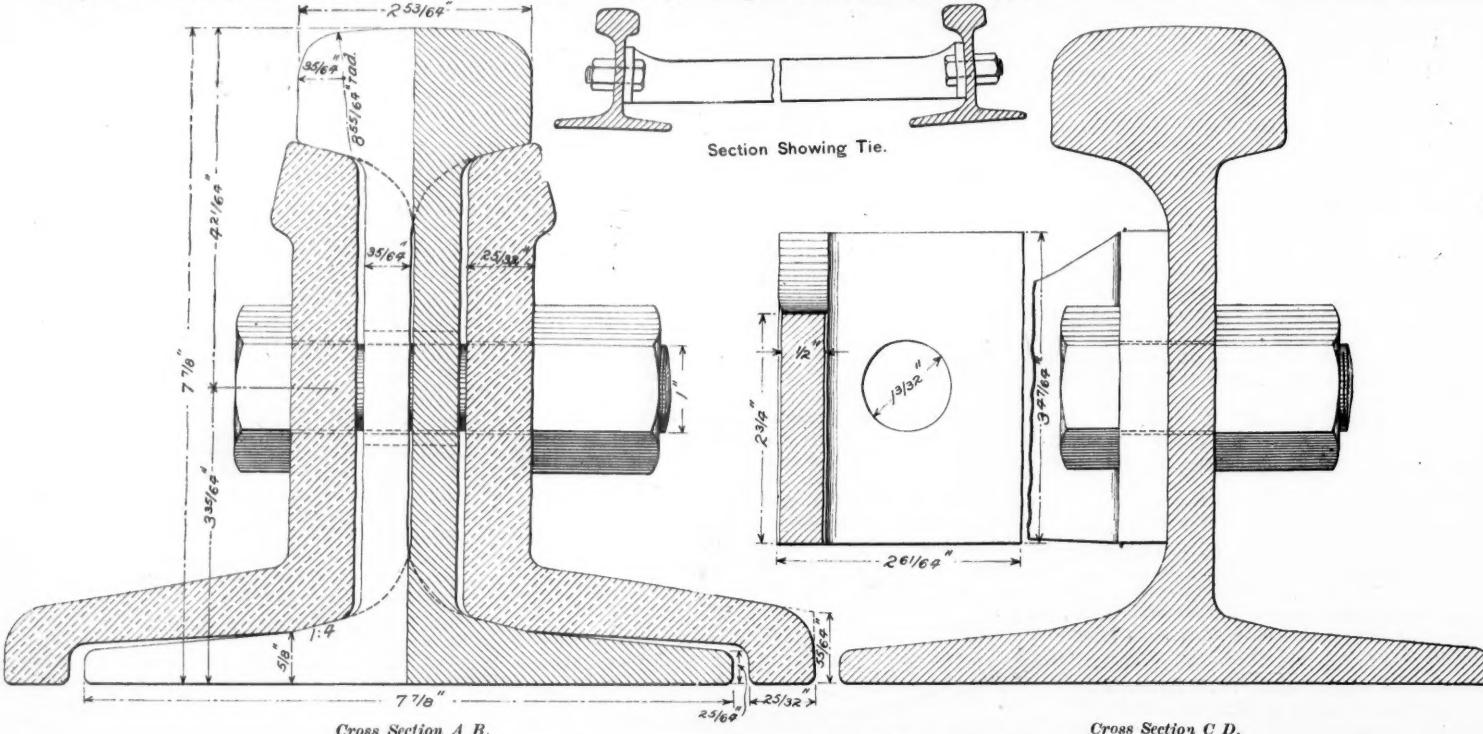
We now arrive, chronologically, at the series of tracks shown which were constructed by Haarmann,

Fig. 1.

track was always distinguished



Section Showing Tie.



THE HAARMANN-VICTOR, SCARFED-JOINT, SLEEPER RAIL.

ered this great museum for the express purpose of learning such lessons in tracklaying and track maintaining as may be derived from a study of all the experience of the past.

Mr. A. Haarmann, the General Manager of the exhibiting company, is widely known by his valuable improvements of the permanent way, and by his monumental work upon the subject, which has been reviewed in the *Railroad Gazette*. His conclusions have resulted in the production of what is doubtless the most perfect track yet laid—and without crossties or sleepers. Probably a brief history of the experience already had with the longitudinally supported rail, chiefly from this collection, will be interesting to those who have not been able to see the exhibit, and may refresh the memories of even

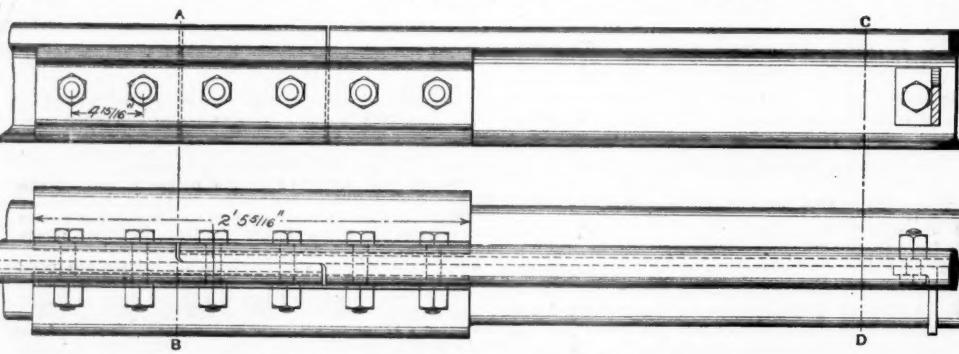
quiet. In 1853 W. Bridges Adams introduced the sandwiched rail (fig. 2), a double-headed one confined between two balks of timber; a sample of this construction which was laid in India in 1872, the rails having been in use 20 years, is shown in this museum. They would make a comfortable track yet.

The Great Western of England also experimented in 1855 with Barlow's saddle rail (fig. 3) which was supported only by the ballast; a specimen of this track after four years' service, in good condition, is displayed. This is said to be

beginning with an example of the method proposed by him in 1878. This example is of a broad-footed high steel rail in a steel box-sleeper, to which it is fastened by clamps and screws. Of course the rail overlaps the sleeper, and both the rail and sleeper are fished. This piece of track was laid in Prussia in 1882, and has been worked 10 years. It furnishes positive proof of the superior endurance of rails supported throughout their length, and of the slight deterioration which the fastenings and sleepers have suffered from time and use.

In 1882 Haarmann proposed a compound steel rail without sleepers, resting directly on the ballast. This compound rail is composed of two halves, which, when riveted together, form a deep rail with a broad base, the division between the parts being a vertical joint in the middle of the cross section of the rail. The specimen of this construction was laid in Prussia in 1885 and used seven years. The parts of this rail were overlapped and fished by short angle-bars. In 1887 Haarmann laid a rail like this, in which the halves were screwed instead of riveted. The example of this construction was worked five years.

In 1890 Haarmann improves upon this method by employing long angular bars for fishing, and the sample shown had been worked during two years. Thus during 10 years' experience with what he calls the jointless compound self-bearing rails had been accumulating; a similar compound rail for harbor lines in pavement having also been tested during the same period. The expenses for maintenance on the harbor lines are stated to have been *nothing*, and upon the hardest worked main lines less than *twenty dollars* per mile per year. The conclusions to be drawn from these experiences demonstrated the advantages gained by a self-supporting rail, halved at the joints and fished by long and heavy angle bars. The increasing demands upon the permanent way made by increasing traffic, heavier locomotives and greater speed have suggested to Messrs. Haarmann and Victor the design for the "Hercules self-bearing rail of steel with web aside," weighing 127 lbs. per yard. The web aside permits of rebating the head and provides a double web at the joints, which are further strengthened by very long and heavy angle bars. This rail is 8 in. high, 8 in. wide on the base, with a head  $2\frac{1}{2}$  in. wide, the upper surface of which is a curve of 8 in. radius, and the curves of the corners at the head



those who have. It will be better for this purpose to treat of that system separately, not referring to the examples of rails laid on crossties, pot sleepers, plate sleepers, etc., of which there is a quite complete display also.

Beginning then with the strap rail, spiked on longitudinal timbers, which rested upon crossties laid in the roadbed, we do not learn that it was laid anywhere except in the United States, where it has continued in use in Georgia until very lately. The Baltimore & Ohio laid some of this flat strap upon granite longitudinals dressed to receive it. Of course the thin plates of iron rolled up under the weight of the locomotives and

to the earliest example of track without sills or cross-ties. Many forms of longitudinal troughs, of cast iron and of rolled iron, in which the rails were supported and fastened by keys or timbers, were tested practically in England between 1850 and 1860, but none were permanently adopted, nor are they represented in this museum. There is, however, a piece of track of double-headed steel rails, laid with iron angle-bar longitudinals and horizontal screw fastenings. This track is said to have been original with Bridges Adams in 1855; the example was laid in India in 1862 and worked two

are of  $\frac{1}{10}$  in. radius. The tie-rods which maintain the gauge are  $2\frac{1}{2}$  in. by  $\frac{1}{2}$  in. in section, enlarged at the ends.

It is not to be doubted that this is the most advanced track which any engineer has yet laid, an experimental piece of this construction having been put in use in 1892. It may be too soon to declare that such must be the railway of the future, yet it is safe to say that it is a logical deduction from careful observation and experimentation. Only a glance at the diagrams, which compare the horizontal and vertical movements under the moving train of a rail on cross-ties with those of a similar rail bearing continuously on the ballast, is needed to show the comparative insignificance of the shocks sustained by the self-bearing rail. Such diagrams and the instrument by which they were taken form a part of the exhibit of the George-Mary Mining Iron and Steel Company, Limited, of Osnabrück, Germany.

Of course such a track as this compels the previous preparation of a perfect bed, and it may be because such a roadbed has been rarely provided in this country that only very small experiments have ever been made here with any system except that of the low rail with crossties.

If American track builders have neglected until now the consideration of the claims of the self-bearing rail they may "point with pride" to the words of Alexander L. Holley, written in 1860: "It would reasonably appear, in consideration of the principles and results mentioned, that the longitudinal system of permanent way will eventually supersede the cross sleeper system."

#### The Pier Movable Sidewalk at the World's Fair.

Considering the length of this road and its location on the pier, so far from the crowded centers, the attendance at the movable sidewalk indicates that, had the Exposition officials placed it in the Midway Plaisance, or about the Exposition grounds, or around the wooded island, it would have proved a convenience for visitors and would have put considerably more money in the

of transportation and demonstrated that this use is not confined to spaces where curves of long radius are required. The Pier Movable Sidewalk Company has under consideration several propositions to move its present plant to some resort for operation next summer. Among them are two locations near New York. It is, of course, possible to add more platforms and have the rate of speed graduated from 12 to 15 miles an hour down to two or three miles an hour.

#### Train Accidents in the United States in September.

##### COLLISIONS.

###### REAR.

2d, on Missouri, Kansas & Texas, at Mingo, Tex., a freight train broke in two and the rear portion afterward ran into the forward one, killing 1 brakeman and fatally injuring another.

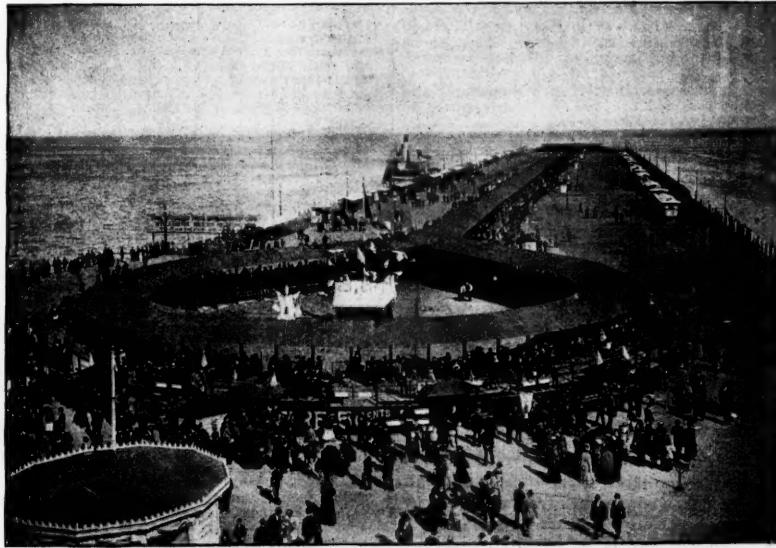
8th, on Pennsylvania road, at Radnor, Pa., a freight train was run into at the rear by a following freight, wrecking several cars. The wreck took fire, but the flames were soon extinguished. Three trainmen were injured.

10th, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Big Walnut, O., a freight train broke in two and the rear portion afterward ran into the front one, making a considerable wreck. A brakeman was injured and an unknown man killed.

11th, on Baltimore & Ohio, at Gastonville, Pa., a local freight train standing at the station was run into at the rear by a following through freight train, wrecking 6 cars. A brakeman was injured.

15th, 1 a. m., on Philadelphia, Reading & New England, on the high bridge at Poughkeepsie, N. Y., a freight train ran into the rear of a preceding freight, damaging 2 cars.

18th, 10 p. m., on Illinois Central, near Manteno, Ill., the first section of southbound passenger train No. 45, of the Cleveland, Cincinnati, Chicago & St. Louis, was slackening speed preparing to stop, on account of the stoppage of a preceding train at a water tank (not the usual water station), and was run into at the rear by the second section of the same train, crushing 1 sleeping car, 1 chair car and 1 day car. Second 45 is said to have passed the last open telegraph office eight minutes behind first 45. The flagman went back a short distance, but the second train seems to have been very close behind the first. Nine passengers were killed and 20 or more injured.



The Pier Movable Sidewalk at the World's Fair.

coffers of the Exposition. The total length of the road on the pier is about eight-tenths of a mile, and it has a seating capacity of between 4,000 and 5,000 persons. The rate of fare is five cents and for this amount a person may ride all day. The average number of fares collected each day is at present about 17,000 and on Illinois Day the total reached 25,780. The illustration, from a photograph, indicates the popularity of the conveyance. The only inducement for a ride on the present line is the novelty of getting on and off while the train is in motion, and of obtaining rest and a place to lunch at the moderate price of five cents. There is no attraction at the outer end of the pier, as it was intended there should be, and the boats land so near the shore end of the pier that a person may as well walk as go to the trouble of getting on and off the train.

A test was made on Aug. 24 to find how much power was required to start the train when loaded with passengers. On that day at about 3 o'clock in the afternoon the seats on the faster moving platform were occupied by from three to four passengers each, so that at least 4,500 persons were riding seated on the train at one time, besides several hundred who were standing on the slow platform. The train was stopped, and after two or three minutes was started. It took 400 amperes at 450 volts, about 241 H. P., to start the train and 205 amperes, about 124 H. P., to run it after starting. The train is eight-tenths of a mile long, and there are two flexible rails that are propelled on the periphery of the wheels of the lower platform and extend the full length of the road.

The establishment of this short section on the pier and its operation on an alignment having four curves of 61 ft. 9 in. radius and a total curvature of 696 deg. in 4,300 ft. of road, has created some interest in this mode

20th, 4:30 a. m., on Pennsylvania road,  $\frac{1}{2}$  mile east of Vandyke, Pa., the first section of the Pacific express, west bound, being stopped by the bursting of an air-brake hose, was run into at the rear by the second section, wrecking an empty passenger car. One trainman was injured. The signalman at Thompsonontown gave a white signal to the second section, before Vandyke had reported the passage of the first section.

21st, 1 a. m., on Pittsburgh & Western, at Ravenna, O., a heavy passenger train ran into the rear of a freight which was entering a side track, wrecking several freight cars. The freight conductor was killed and the engineer and fireman of the passenger train injured. It is said that the passenger train was running at high speed and that the Pullman vestibules prevented a more serious disaster.

26th, on Chicago & Northwestern, near McMillan, Wis., a freight train descending a grade broke in two and the rear part afterward ran into the front one, wrecking several cars. A passenger in the caboose was injured, probably fatally.

27th, 2 a. m., on Chicago & Grand Trunk, at Bellevue, Mich., westbound passenger train No. 5, which was just starting from the station, was run into at the rear by passenger train No. 9, running at considerable speed, crushing the rear car, a private car. Mr. and Mrs. Newland were killed and 2 other passengers within this car and 2 employees injured. There was a dense fog at the time. The foremost train was late, and the engineer of No. 9 was evidently oblivious to the fact that No. 5 made stops which No. 9 did not make.

29th, on Chicago & Grand Trunk, near Marcellus, Mich., a freight train broke in two, and the rear portion afterward ran into the forward one, wrecking three cars.

Two trainmen were injured.

30th, on Pennsylvania road, near Lancaster, Pa., a freight train ran into the rear portion of a preceding freight which had broken in two, wrecking the engine and three cars. The conductor of the second train jumped off and was injured.

And 19 others on 15 roads, involving 7 passenger and 24 freight and other trains.

##### BUTTING.

5th, on Cleveland, Cincinnati, Chicago & St. Louis, at

Batesville, Ind., butting collision between a passenger train and a freight, wrecking the mail car and five freight cars. One man was killed and 6 trainmen were slightly injured. An operator made a mistake in telegraphic order.

7th, on South Chicago & Southern (a short branch or loop line of the Pittsburgh, Fort Wayne & Chicago, operated by the Pennsylvania Company), near Colehour, Ill., butting collision between eastbound passenger train No. 48, making a very bad wreck. Eleven passengers and 1 brakeman were killed, and 7 passengers and 3 trainmen were injured. The smoking car of train No. 12 was practically demolished by being crushed against the baggage car ahead of it, and most of the fatal injuries were in this car. The train dispatcher at Fort Wayne had to make a meeting point for these trains every morning, but on this occasion he sent the order to train 160 instead of train 12. This order was useless, and on his attention being called to the fact by the conductor of train 49 he altered the order to issued a new one for train 49, but postponed the duty of altering the order which had been issued for the eastbound train. This was the fatal error, as the eastbound was the ruling train; and No. 12 passed Colehour on time without orders.

7th, 6 a. m., on Chicago, Rock Island & Pacific, at Gates, Neb., butting collision between a passenger train and a freight, wrecking both engines and damaging several cars. A mail clerk was fatally injured and 2 passengers were hurt. It is said that the passenger train had recently been put on and that the engineman of the freight forgot about it.

9th, 7 a. m., on Rome, Watertown & Ogdensburg, near Norwood, N. Y., butting collision between a passenger train and a freight, badly damaging both engines. One passenger and a brakeman were injured. It is said that an operator delivered to the passenger train a clearance card when he held an order for it.

9th, on Buffalo, Rochester & Pittsburgh, at Mumford Junction, N. Y., butting collision between a Lehigh Valley passenger train and a freight train, badly damaging both engines. Three trainmen and 3 passengers were injured. It is said that the freight was running on the time of the passenger.

9th, on Chicago, Burlington & Quincy, near Hinckley, Ill., a passenger train ran over a misplaced switch and into the head of a freight, badly damaging both engines. The passenger engineer was fatally injured.

10th, 6 a. m., on New York, Chicago & St. Louis, near Leipsic Junction, O., butting collision between freight trains 37 and 40, wrecking both engines and many cars. Both engineers and 1 fireman were killed and 3 trainmen were injured. The collision was on a long straight line, but there was a dense fog at the time. An operator holding an order for train No. 40 delivered it to No. 46.

16th, 9 a. m., on New York Central & Hudson River, at Clifton Springs, N. Y., butting collision between a freight and a work train, damaging both engines; conductor and engineer injured.

19th, on Lehigh Valley, near Fairview, Pa., butting collision between passenger trains 7 and 134; engineer and 6 passengers injured. The trains met on a straight line and both enginemen succeeded in greatly reducing their speed. Train 134 had been ordered to take the side track at Fairview, but did not do so.

22d, about 5 a. m., on Wabash road, at Kingsbury, Ind., a passenger train ran over a misplaced switch and into the head of a freight train standing on the side track, making a very bad wreck, killing 9 passengers and 3 trainmen and injuring 17 passengers and 3 trainmen. Both engines, several freight cars and two passenger cars were completely wrecked and the boiler of the passenger engine exploded moment after the collision, adding to the destruction. A passenger train had just passed and a brakeman turned the switch on the supposition that the freight was ready to start. It is said that he might have reset the switch, but was paralyzed by freight at sight of the passenger train.

25th, 3 a. m., on East Tennessee, Virginia & Georgia, at Jesup, Ga., an engine standing in the yard was started, by some unknown cause, and ran backward six miles on the main track, where it met a freight train, wrecking both locomotives and several cars. The fireman of the freight was injured.

25th, on Pittsburgh, Fort Wayne & Chicago, at Lafayette, O., a freight train ran over a misplaced switch and into the head of another freight, wrecking several cars. A man in charge of horses was injured.

29th, on Chicago & Grand Trunk, near Vicksburg, Mich., butting collision of freight trains, injuring 3 men.

■ And 7 others on 3 roads, involving 1 passenger train and 13 freight and other trains.

##### CROSSING AND MISCELLANEOUS.

5th, 3 a. m., on Cincinnati, Portsmouth & Virginia, at Harden, O., a freight train ran over a misplaced switch and into the head of a work train standing on the side track, making a bad wreck. A fireman and 1 other man were killed and an engineer and a watchman were injured. A dwelling-house near by was damaged. The watchman sent a boy to set up the switch after it had been used, and it is said that the boy locked it in the wrong position.

7th, on Louisville & Nashville, at Earlington, Ky., collision between a passenger train and a freight; mail agent and baggage master fatally injured.

12th, on Illinois Central, at Kensington, Ill., several cars of a switching freight train broke loose from the engine and ran uncontrolled at considerable speed into a string of platform cars standing at the freighthouse platform. These cars were being loaded with fire engines which had been at work on the big fire in the Pullman car shop yards and 4 firemen and a boy were badly injured.

13th, on Philadelphia & Reading, at Philadelphia, a yard engine ran over a misplaced switch, and into the side of a passenger train, killing the engineer and fireman of the passenger train. The engine of the passenger train was badly wrecked.

20th, 4:30 a. m., on Lehigh & Hudson River, at Lake Grinnell, N. J., a passenger train ran into the locomotive of a freight train which stood partly on the main track and partly on the side track, wrecking both engines and two freight cars. Part of the wreck fell down a bank and one passenger car, one express car and one freight car were burned up. Four trainmen were injured. The freight train had entered a side track to wait for the passenger train, which was running in the same direction. While standing there, the conductor, who was near the rear end of the train, signaled the engineman to move forward, and at the same time told the flagman to go back; the conductor then went forward himself and sat down on the main track, where he was run over and killed by the passenger train, having probably fallen asleep. The flagman did not go back. The Superintendent has been unable to discover why the conductor

moved his train forward, as the side track was of ample length.

20th, 2 p.m., on Southern Pacific, at Merced, Cal., a passenger train ran over a misplaced switch and into a freight train standing on the side track; fireman and 1 passenger injured.

22d, on Ohio River road, near Wheeling, W. Va., an empty engine ran into a part of a freight train left standing on the main track, injuring a passenger in the caboose.

26th, on Northern Pacific, at Gladstone, N. D., collision of freight trains, killing 1 employee.

And 14 others on 12 roads, involving 4 passenger and 22 freight and other trains.

#### DERAILMENTS.

##### DEFECTS OF ROAD.

15th, on Richmond & Danville, at Columbus, Miss., a freight train was derailed at a defective switch. The engineer was injured.

16th, on Atchison, Topeka & Santa Fe, at Brewster, Tex., a freight train was derailed by spreading of rails and 7 cars ditched. A tramp stealing a ride was killed.

And 7 others on 7 roads, involving 2 passenger and 6 freight and other trains.

##### DEFECTS OF EQUIPMENT.

1st, on Philadelphia & Reading, at Bridgeport, Pa., a freight train was derailed by a fallen brakebeam and 20 cars were wrecked. A man stealing a ride was injured.

7th, on New York, New Haven & Hartford, near Leominster, Mass., a freight train was derailed by a broken wheel and the conductor was injured.

13th, on Rome, Watertown & Ogdensburg, at Sand Bank, N. Y., a freight train consisting of 53 cars was suddenly stopped by the rupture of an air-brake hose on the first car; only 15 cars were air-braked, and those behind them crowded forward so forcibly that an empty platform car near the middle of the train was crushed, causing the derailment of 5 other cars.

15th, on Pittsburgh & Western, at Sharpsburg, Pa., the tender of a passenger train was derailed by the breaking of a flange while the train was running at considerable speed, and one truck ran about 80 ft. on the ground until it came to a new oak road crossing, where the wheels ran back on the track. The engineer succeeded in stopping the train before the wheels went off again.

25th, on New York, Lake Erie & Western, near Otisville, N. Y., a freight train was derailed by a broken journal and 14 cars were wrecked. A brakeman was injured.

28th, on New York Central & Hudson River, near Hillsdale, N. Y., a milk train was derailed by a broken flange and fell down a high bank. A brakeman was killed and the engineer and fireman injured.

And 11 others on 9 roads, involving 2 passenger and 9 freight and other trains.

##### NEGLIGENCE IN OPERATING.

2d, on Chicago, Burlington & Quincy, near Streator, Ill., a mixed train broke through a bridge and one passenger car and several freight cars fell 25 ft., making a bad wreck. The wreck took fire from a stove and several passengers were somewhat burned. About a dozen passengers altogether were injured and 2 men stealing rides were injured. It is said that the train was derailed by a heavy stone which fell from a platform car just before the bridge was reached.

5th, on Nevada County Narrow Gauge road, near Grass Valley, Cal., a train carrying a circus was derailed while moving slowly around a curve and the engine and several cars were overturned. A circus man and a trespasser were killed and 4 circus men and 2 trainmen were injured. It is said that some horses in one of the cars moved suddenly to the lower side of the car, causing it to tip over.

9th, on West Shore road, at East Buffalo, N. Y., a passenger train was derailed by a misplaced switch, injuring 3 passengers.

14th, on Baltimore & Ohio, at Dillon Falls, O., a freight train was derailed at a point where rails had been taken up by track repairers, and the engine and 13 cars were wrecked. The engineer was killed. The section master claims to have had a flag out.

16th, on Southern Pacific, at Harvey's Canal, La., an engine and caboose ran into an open draw, the engine going to the bottom of the canal. The engineman went down with the engine, but swam out. Two trainmen and a man stealing a ride were injured.

16th, on Chicago, Milwaukee & St. Paul at Olivia, Minn., a freight train was derailed at an unfastened switch, and the engine was overturned. Several cars were badly wrecked, and the engineer, fireman and 1 brakeman were killed.

27th, on New York, New Haven & Hartford, at New London, Conn., an empty engine was derailed at a derailing switch approaching the drawbridge over Shaw's Cove and was mostly submerged in water and mud. It is said that the engineer failed to notice that the derailing switch was set against him.

25th, on Missouri, Kansas & Texas, near Sayers, Tex., butting collision of freight trains, injuring 4 trainmen and a tramp.

27th, on Chicago & Northwestern, near Crescent City, Ia., butting collision between two work trains, one running backward, wrecking several cars. Three employees were killed and 5 injured.

28th, on Louisville & Nashville, near Hazel Patch, Ky., butting collision between a passenger train and a freight, making a bad wreck; express messenger and fireman killed, 4 other trainmen and 1 passenger injured. The conductor and engineman of the passenger train overlooked a meeting order.

28th, on Chicago, Burlington & Quincy, near Streator, Ill., butting collision between a second class and a third-class freight train, badly damaging both engines. The engineer of the second-class train was killed and several passengers were injured. The crew of the third-class train forgot that the other train was second-class and therefore superior.

And 10 others on 9 roads, involving 2 passenger and 8 freight and other trains.

##### UNFORESEEN OBSTRUCTIONS.

10th, on Baltimore & Ohio, in Washington, D. C., passenger train 21, engine 807, was derailed by a bar of iron on the track and the engine and 2 cars were ditched. The engineer and fireman were slightly injured.

16th, on East Tennessee, Virginia & Georgia, near Browns, Ala., a work train was derailed by running over a cow, wrecking 3 cars. The conductor and 5 other employees were injured.

22d, 1 a.m., on Queen & Crescent line, near Birmingham, Ala., express train No. 1 was derailed, by a loose rail, on an embankment and the engine and 2 cars were wrecked. It is said that the splice bars had been maliciously removed. Five trainmen were injured.

27th, 10 p.m., on Missouri Pacific, near Hughesville, Mo., the engine of a passenger train was derailed by a sleeper which was fixed between the ties on a trestle; the engine fell down a bank and the baggage car was derailed. The engineer, fireman and express messenger were injured.

28th, 1 a.m., on Louisville & Nashville, at Gulfport, Miss., passenger train No. 2 was derailed at an unfastened switch; the engine was overturned and most of the cars ditched. Three tramps riding on the platform of the baggage car were killed and another injured. Six trainmen were injured. It is said that the switch had been maliciously misplaced.

And 7 others on 7 roads, involving 3 passenger and 4 freight and other trains.

##### UNEXPLAINED.

6th, 2 a.m., on Bennington & Rutland, near Wallingford, Vt., the last car of a passenger train, an empty sleeping car, broke through a bridge over Otter Creek, falling, with the bridge, 15 ft., and making a bad wreck. The rest of the train passed the bridge in safety, and the coupling forward of the last car broke. The bridge was a Howe truss, and it is said that some nuts had been maliciously removed from the rods, but we have not been able to confirm the report.

12th, on Indiana & Illinois Southern, at Dugger, Ind., a freight train was derailed, and the fireman killed.

13th, on Central of Georgia, near Troy, Ala., the engine and 4 cars of a freight train were derailed; the engine was overturned, and the fireman killed. The engineer was injured.

13th, on Chicago, Milwaukee & St. Paul, near Oakwood, Wis., a southbound freight train was derailed, making a bad wreck which fouled both tracks. Two boys stealing rides were killed and another injured. A northbound passenger train came along within less than a minute after the wreck and was barely stopped in season to avoid it.

15th, on Texas & Pacific, near Dallas, Tex., a freight train was derailed near a bridge and fell through it, and 14 cars lodged in White Rock Creek 18 ft. below. A man stealing a ride was killed and 2 trainmen were injured.

20th, on Atchison, Topeka & Santa Fe, near Montgomery, Tex., a passenger train was derailed and 4 passengers injured, 3 probably fatally.

21st, on Houston & Texas Central, near Wilmer, Tex., a passenger train was derailed and 1 passenger injured.

25th, 5 a.m., on Great Northern, near Snohomish, Wash., a work train carrying a pile driver fell through a bridge, making a bad wreck and injuring 3 employees. It is thought that the pile driver struck some part of the bridge and weakened it.

28th, 2 a.m., on Southern Pacific, near Pajaro, Cal., two sleeping cars in a circus train were derailed and ditched, 2 men being slightly injured. The wreck took fire from an exploded lamp, but did not do much damage.

And 11 others on 10 roads, involving 2 passenger and 9 freight and other trains.

##### OTHER ACCIDENTS.

12th, 8 a.m., on Louisville, Evansville & St. Louis, at St. Louis, Mo., a switching engine was wrecked by the explosion of its boilers. The engineer and fireman were fatally injured.

24th, 1 a.m., on Atchison, Topeka & Santa Fe, at Birmingham, Tex., the engine of a freight train was badly damaged by a timber wedged between the sleepers on a trestle, with the evident intent of derailing the train. The blow-off cock was broken, so that the engine at once "died."

28th, on Philadelphia, Wilmington & Baltimore, at Wilmington, Del., a yard engine was damaged by the explosion of its boiler; engineer and fireman injured.

And 3 others on 2 roads, involving 3 passenger trains.

A summary will be found in another column.

#### The New Wickes Refrigerator Car.

The Wickes Refrigerator Car Company has recently brought out a new design of refrigerator car which differs in several important particulars from the car introduced by the company about ten years ago and still in extensive use. The new car is intended to represent the latest and best practice in refrigerator car construction, and embodies, so far as possible, the standards of the Master Car Builders' Association. Especial attention has been given to the reduction of dead weights and an increased strength and capacity of the car.

Among the changes noticed is an increase in the thickness of the walls of the car due to an additional outside lining. Otherwise the insulation remains the same. For the two ice tanks at the ends of the car, one at each end is substituted, and instead of having 4 in. air ducts at the back and sides of the tank, the walls of the car serve as tank walls, and the only air duct is that next to the storage-room of the car. The car walls are protected by vertical oak bars placed closely together inside the tank.

The air duct between the ice tank and storage-room is open at top and bottom, as in the older car, allowing air to pass directly down as well as through the ice. For the interlacing strips of galvanized iron which covered the tank frame of the old car there has been substituted a number of continuous strips of iron of about 7 in. in width which run horizontally across the car. The upper 3 in. of this strip are bent outward at right angles with the body of the strip so as to project into the air duct. Between adjacent strips openings of 1 in. in width are left, thus permitting air to pass freely from the ice tank into the duct. These leaves or shelves are thus kept cool and serve to condense and collect the moisture in the descending air.

The hopper and galvanized wire meshing, which in the first cars was stretched beneath the ice tanks, is omitted, thus allowing the tank to be made about 18 in. deeper. These changes in tank construction result in a considerable increase in storage capacity and at the same time allow a slight increase in ice tank capacity. The oak grate bars in the bottom of the tank are now made in three sections so that they can be removed, thus facilitating their cleaning. In the drainage pan beneath the ice tank is a trap of new design which can

be desired be so adjusted as to close all communication between the inside of the car and the outside air.

The doors, which were formerly made with pine jambs with a rubber tube or cushion in a rabbeted groove, now have oak jambs covered their entire width with padded canvas cushions, the new construction being less liable to cause trouble by swelling. There being but one tank, one hatchway is depended upon to properly fill it. This hatchway, instead of being closed by the usual heavy plug door, has a single door similar in construction to the side doors. In the transportation of fruit, ventilation is obtained by removing this plug door, dropping it into the tank, and substituting in its place a tightly fitting screen, through which air passes into the car and circulates through the tank and storage-room.

An arrangement of meat racks has been designed for this car by means of which a material increase in head room is obtained.

A new feature introduced is a transverse gutter at each end directly in front of the ice tank, the slight up and down grades of ordinary roads giving sufficient inclination to the floor to drain the floor when, as is often the case, ice is introduced in the body of the car in the shipment of beer and other freight not affected by moisture. These gutters are drained by automatic ball traps.

The weight of this car is about 38,500 pounds and its rated capacity 60,000 pounds. Its ice capacity is about 6,000 pounds.

#### Some Awards at the World's Fair.

In our issue of Oct. 13 there appeared a list of the awards in the Transportation Department of the World's Columbian Exposition. The following list gives awards in other departments which appear to be likely of most interest to the readers of the *Railroad Gazette*.

**A** Abendroth & Root Mfg. Co., New York City, special riveted pipes, sectional water tube boiler. Acme Machinery Co., Cleveland, O., threading machines. American Hoist & Derrick Co., St. Paul, Minn., contractors' machinery. American Screw Co., Chicago, Ill., heading machine, threading machine. American Well Works, Aurora, Ill., collection of pumping and well appliances, well boring, jetting and drilling machines, well auger. Anti-Friction Metal Co., Chicago, Ill., anti-friction metal. Armstrong Mfg. Co., Hartford, Conn., pipe threading machinery. Ashcroft Mfg. Co., New York City, pressure and vacuum gauges. Beaman & Smith, Providence, R. I., heavy standard milling machine, No. 2 standard drilling and boring machine, No. 1 horizontal spindle drilling and boring machine. Bessey & Co., Chas. H., Chicago, Ill., oil cups. Bethlehem Iron Co., So. Bethlehem, Pa., nickel-steel propeller shafts and model of 125 ton steam hammer. Billings & Spencer Co., Hartford, Conn., machinists' tools and drop forgings, box opener. Bliss & Co., E. W., Brooklyn, N. Y., power presses, sacking machines and gang slitters. Brainard Milling Machine Co., Boston, Mass., tool milling machines, small milling cutter grinder, gear cutting machine. Bristol's Mfg. Co., Waterbury, Conn., recording gauges for pressure, temperature and electricity. Brown & Sharpe Mfg. Co., Providence, R. I., universal milling machine, exhibit of machine tools, universal grinding machine. Buckeye Engine Co., Salem, O., simple engines, medium speed, high speed, tandem compound, cross compound condensing, triple expansion four cylinder condensing engines, exhibit of an engine cut away through cylinder, steam chest and valves. Buckeye Iron & Brass Works, Dayton, O., power feed turret, forming lathe, automatic hexagon milling machine, high pressure improved hydraulic power pump, brass valves and fittings, iron body valves, tobacco cutter.

Buffalo Scale Co., Buffalo, N. Y., eight awards, combination beam for hay scales, Dormant, Columbian and Boston platform scales, reverse acting meat beam, patent Boston market scales, patent testing machine. Buffalo Steam Pump Co., Buffalo, N. Y., steam pumps. Bullock Mfg. Co., M. C., Chicago, Ill., drills, drilling machinery, Gadd's heading machine, Stine-Smith mining machine, Mitchell long wall machine, rock drills, portable hoists, single and double drum, double cylinder drums, winches and quarry hoists, Simplex gas engines.

**C** Cambria Iron Works, Chicago, Ill., four awards, collection of products, washed metal, Kelly steel converter and sections of iron and steel rails, steel axles. Cameron Steam Pump Works, New York City, pumps. Camp & Lane Machine Co., Akron, O., complete mining and hoisting machine. Capitol Mfg. Co., Chicago, Ill., Adams automatic bolt threading machine, Cook universal die adjusting automatic bolt threading machine, Capitol combination pipe and rod threading and cutting off machine, Cook full automatic nut tapping machine. Carborundum Company, The Monongahela, Pa., carborundum. Crompton Steel Co., Reading, Pa., steel specimens. Central Iron & Steel Works, Brazil, Ind., open hexagonal turbuckles. Chapman Valve Mfr. Co., Chicago, Ill., straightway valves, heavy union flanges recessed for lead, automatic indicator for sprinkler valves, fire hydrants. Chicago Belting Co., Chicago, Ill., leather belts. Chicago Fireproof Covering Co., Chicago, Ill., mineral wool, its manufacture and products, steam pipe covering. Chicago Iron Works, Chicago, Ill., hoisting engine for flat rope. Chicago Rawhide Mfg. Co., Chicago, Ill., rawhide belting, Chrome Steel Works, Brooklyn, N. Y., collection of products of chrome steel. Cincinnati Corrugating Company, Piqua, O., American terne plate. Clark, Fisher & Co., Trenton, N. J., anvils, vises, and anvils and vises combined. Cleveland Twist Drill Co., Cleveland, O., machine tools. Consolidated Safety Valve Co., New York City, valves.

Crane Company, Chicago, Ill., pipe tools, screwed and flanged fittings.  
Crane Elevator Co., Chicago, Ill., freight elevating and hoisting machinery, horizontal and vertical double cylinder steam reversing engines, two steam hoisting engines.  
Crescent Steel Co., Pittsburgh, Pa., three awards, mining drill steel, fractures of steel, steel (die) compressed polished drill rods.  
Crosby Steam Gage & Valve Company, Boston, Mass., stationary, marine and locomotive pop safety valves, feed water regulator and revolution counter, steam engine indicator, single spring gage, double spring gage and water line siphon valve, pressure gage tester.  
Curitt & Curtis, Hartford, Conn., thread machine, die stock.

**D**

Darling, Brown & Sharpe, Providence, R. I., tools for accurate measurement.  
Davidson, M. T., Brooklyn, N. Y., compound boiler feed pumps.  
Dixon Crucible Co., Ticonderoga, N. Y., graphite, crude, in lumps.  
Detrick & Harvey, Baltimore, Md., open side planers.  
Detroit Lubricator Company, Detroit, Mich., sight feed lubricators, low water alarm, oil cups, glass oil cups, valves and other brasswork for engines and machinery.

**E**

Eddy Valve Co., Waterford, N. Y., straightway valves for water and steam, fire hydrants.  
Electric Pipe Bending Co., Harrison, N. Y., round, flat, oval and special forms of pipe coil.  
Exhaust Ventilator Co., Chicago, Ill., exhaust fans for removing hot air and steam.

**F**

Fairbanks & Co., Chicago, Ill., Standard scales, measures and weights, hopper abattoir, suspension, packing-house, stock, platform, counter, railway track, weighmaster's beams, iron dealer's bullion, cloth, prescription, postal and bank scales, paper beams, automatic night register, general exhibit and Fairbanks' automatic cement tester.  
Falkenau, A., Philadelphia, Pa., machine tools, power tool grinder.  
Falls Rivet & Machine Co., Cuyahoga Falls, O., ring oil bearings, friction clutch, couplings for driving pulleys.  
Ferracute Machine Co., Bridgeton, N. J., cutting presses.  
Foos Mfg. Company, Cincinnati, O., machinery for crushing, grinding and pulverizing, safety devices, attrition mill.  
Fox Machine Co., Grand Rapids, Mich., shapers.

**G**

George Mary Mining, Iron & Steel Company, Osnabruck, Germany, rail joints and sleepers, etc.  
Gleason Tool Co., Rochester, N. Y., Gleason engine lathes.  
Goodsell Packing Co., Chicago, Ill., piston rod packings for steam and other joints, sheets and rings with and without wire cloth insertion, metallic piston rod packing.  
Gould & Eberhardt, Trenton, N. J., combination drill and tapping press, new type gear cutter.  
Goulds Mfg. Co., Seneca Falls, N. Y., deep mine pump, triplex power pumps for boiler feed.

**H**

Hancock Inspirator Co., Boston, Mass., inspirators for feeding steam boilers.  
Harrisburg Foundry & Machine Co., Harrisburg, Pa., Ideal tandem compound engine.  
Hayden & Derby Mfg. Co., Bridgeport, Conn., injectors.  
Hawley Down Draft Furnace Company, Chicago, Ill., down draft furnace.  
Heine Safety Boiler Co., St. Louis, Mo., safety water tube steam boilers.  
Hendy Machine Co., Torrington, Conn., planers, engine lathes, pillar shapers.  
Hilles & Jones Co., Wilmington, Del., shears and punches, No. 4 plate planing machine and No. 4 vertical milling machine.  
Hoerde Mining & Steel Company, Hoerde, Westphalia, Germany, wheels, axles and iron superstructure for railway.  
Hoppes Mfg. Co., Springfield, O., live steam feedwater purifier, exhaust feedwater heater.  
Horton & Sons Co., E. Windsor Locks, Conn., chucks.  
Hunt Company, C. W., New York City, steam engines, governors for steam hoisting engines.

**I**

Ingersoll Sergeant Drill Co., New York, adjustable tunnel column, clamp and crescent, battery, drills and coal mining machines, air compressor, air head for rock drill piston, cold air compressor.  
Jarecki Mfg. Co., Erie, Pa., exhibit of brass goods and iron fittings, pipe cutting machinery combined with engine.  
Jeffery Mfg. Co., Columbus, O., chain elevators, electric coal mining machines, electric rotary coal drill and ironclad motor, air power rotary coal drills.  
Jessop & Son, Sheffield, Eng., crucible cast steel in bars, sheets and forgings.  
Johns Mfg. Co., H. W., Chicago and New York, asbestos packings and coverings, vulcanized, consisting of sheets, gaskets, rings and special forms used in connection with electrical locomotives, other machinery, asbestos manufacturing machines and products, technical display of asbestos.

**K**

Keasby & Mattison Co., Ambler, Pa., pipe covering.  
Keystone Mfg. Co., Buffalo, N. Y., patent nonpareil wrenches, Knowles Steam Pump Works, New York City, double acting triplex pump.  
Krupp, F., Essen, Germany, ten awards, bedplate of molded steel casting, collection of steel castings, collection of steel tires, pressed steel centrifugal vessels, steel cast center for locomotive driving wheel, collection of forgings of open hearth steel, steel cast stem for armored vessels, steel cast locomotive frame, collection of products of iron and steel including compound armor plates.  
Krupp, Fried., Grusonwerk, Magdeburg Buckau, Germany, chilled iron.

**L**

Laidlaw & Dunn Co., Cincinnati, O., pumping machinery.  
Lake Erie Engineering Works, Buffalo, N. Y., 1,000 H. P. vertical compound engine.  
Lidgerwood Mfg. Co., New York City, hoisting engines for mine or contract service, bridge erection and in the operation of wire rope tramways.  
Link Belt Machinery Co., Chicago, Ill., transmission of power by manilla rope.  
Lodge & Davis Machine Tool Co., Cincinnati, O., machine tools.  
Long & Allstated Co., Hamilton, O., boiler sheet and horizontal punching machine, multiple punching machine, angle iron punching machine.  
Low Moor Iron Company, Bradford, Great Britain, sea lime, coal and ironstone and refined metal, puddle and finished iron.  
Lunkenheimer Company, Cincinnati, O., fittings and appliances for steam engines and machinery, regrinding valves, gate valves, lubricators and steam whistles.

**M**

Manning, Maxwell & Moore, New York, machine tools and machines for working metals.  
Mason, Volney & Co., Providence, R. I., hoisting machinery, friction clutches.  
McGowan & Co., J. H., Cincinnati, O., general exhibits of pumps, etc., back pressure valves, gate valves, sprinklers, hydraulic tobacco machine.  
Meeker, S. J., Newark, N. J., malleable iron, gray iron and brass castings.  
Merrill Bros., Brooklyn, N. Y., drop hammers.  
Morgan Engineering Co., Alliance, O., steam hammer, overhead traveling crane.  
Morse Twist Drill Machine Co., New Bedford, Mass., twist drills, taps and dies, milling cutters, reamers and chucks.  
Munson, Chas., Belting Co., Chicago, Ill., leather belting.

**N**

Nathan Mfg. Co., New York City, injectors, lubricators, oil cups and attachments.  
National Machinery Co., Tiffin, O., bolt cutting, heading and tapping machines.

National Pipe Bending Co., New Haven, Conn., National feed water heater.  
Neptune Meter Company, New York City, water meters.  
Newton Machine Works, Philadelphia, Pa., cold sawing machine.  
New York Belting & Packing Co., New York City, rubber belting, display of rubber packing, gaskets, balls, rolls, hose and tubing.

New York Safety Steam Power Co., New York City, automatic cut-off engine.

Niles Tool Works, Hamilton, O., turret-head screw machine, exhibit of ironworking tools, heavy machine tools.

Northampton Emery Wheel Co., Leeds, Mass., emery wheels.  
Norton Emery Wheel Company, Worcester, Mass., emery wheels, toolroom grinding machine, twist drill grinding machine.

Norwalk Iron Works Co., South Norwalk, O., air compressors.

Nye, George E., Chicago, Ill., steam vacuum pumps.

**O**

Olsen & Co., Tinian, Philadelphia, Pa., testing machines and micrometers.

Osterby Iron & Steel Works, Dannemora, Sweden, collection of charcoal and bar iron.

Otis Steel Company, Cleveland, O., steel boiler and firebox plate, cast steel rolls.

Otto Gas Engine Works, Philadelphia, Pa., Otto gas engine and gasoline engine.

**P**

Page Belting Co., Concord, N. H., link and leather belting.

Parker Co., Chas., Meriden, Conn., machinists' vises.

Penberthy Injector Company, Detroit, Mich., injectors.

Pennsylvania Steel Co., Steelton, Pa., bridge materials.

Pittsburgh Crushed Steel Co., Pittsburgh, Pa., four awards, crushed steel, steel emery, putty powder, rouge.

Pond Machine Tool Co., Plainfield, N. J., lathes and boring machines, 42-in. car wheel or tire lathe for turning tires on their own axles, planers.

Pottstown Iron Co., Pottstown, Pa.

Powell & Co., Wm., Cincinnati, O., eight feed lubricators and engine grinding valves.

Pratt & Whitney Co., Hartford, Conn., collection of machine tools, standard measuring machines and standard gauges, miscellaneous small tools for machinists' use, Thurston torsion machine and Thurston oil tester.

**R**

Rand Drill Co., New York City, high pressure air compressor, duplex straight line air compressors, rock drills and Derby bit.

Randolph & Clowes, Waterbury, Conn., three awards, collection of sheet copper and brass, collection of brazed brass tubes and moldings, seamless drawn copper tubes.

Reliance Gauge Company, Cleveland, O., solderless copper floats and safety alarm water column.

Ricardo Honey Limapan, Hidalgo, Mexico, iron rods worked in a cold state.

Rider Engine Co., New York City, hot air pumps for supplying water to restaurants, hotels, etc.

Riehle Bros. Testing Machine Co., Philadelphia, Pa., collection of testing machines, measuring instruments.

Roebeling Sons Company, J. A., Chicago, Ill., sheaves and cables for transmission of power.

Roots & Co. The P. H. & F. M., Indianapolis, Ind., portable forges, blacksmith blowers, rotary force pump blowers, gas exhauster.

**S**

Schlieren, Chas. A., Chicago, Ill., perforated leather belting.

Schutte & Co., L., Philadelphia, Pa., injectors, steam jet system pumps, jet pump, artesian well system pumps, hydraulic valves, steam trap, automatic eductor and plain eductor, exhaust steam eductor condenser.

Sellers & Co., Wm., Philadelphia, Pa., electric traveling crane injectors, Rick bottle-cleansing machine, bottle washing and rinsing machine in combined operation, hydraulic testing machine.

St. Louis Hydraulic Brick Co., St. Louis, Mo., brick and fire clay.

Saunders' Sons, D., Yonkers, N. Y., machines for cutting and threading pipe.

Shaw Electric Crane Co., Muskegon, Mich., electric traveling crane.

Sherwood Mfg. Company, Buffalo, N. Y., injectors, oil cups, oil pumps, lubricators, flue scrapers, gauge cocks, grease cups and flue blowers.

Singer, Nimick & Co., Pittsburgh, Pa., steel.

Solid Steel Co., Alliance, O., collection of castings.

Springfield Emery Wheel Company, Bridgeport, Conn., stands, safety device for edge grinders, safe chuck for cup wheels, surface and large shear blade grinding machine, emery wheel.

Standard Tool Co., Cleveland, O., exhibit of twist drills, fluted drills, reamers, drill sockets, arbors, mandrels, taps, milling cutters, chucks, gauges, screw-driver bits.

Stearns Mfg. Co., Erie, Pa., automatic high speed engine, Gill water tube boilers.

Stiles & Parker Press Co., Brooklyn, N. Y., punching presses and drop hammers.

Stillwell-Bierco & Smith-Vaile, Chicago, Ill., open feed water heater, live steam purifier.

Sullivan Machine Co., Chicago, Ill., swivel head channel drilling machinery.

**T**

Tanite Company, Stroudsburg, Pa., emery, corundum, tripoli, and rotten stone.

Thomson Meter Company, Brooklyn, N. Y., water meters.

Tripp Metallic Packing Co., Boston, Mass., metallic packing for piston rods and valve stem.

Tyler Tube Co., Washington, Pa., charcoal iron tubes.

**U**

United States Car Co., Chicago, Ill., shafting.

United States Encaustic Tile Works, Indianapolis, Ind., encaustic tile.

**V**

Vanzetti & Co., S., Milan, Italy, steel castings.

Vulcan Iron Works Co., Chicago, Ill., drop hammers and pile caps.

**W**

Wainwright Mfg. Co., Boston, Mass., surface condenser and feed water heaters.

Warner & S. A., Cleveland, O., machine tools and process for arranging and cutting the teeth of spur wheels.

Warren, Webster & Co., Chicago, Ill., Williams vacuum system of steam heating and Webster vacuum feed water heater and purifier.

Washburn & Moen, Worcester, Mass., iron and steel bars, rods and wire.

Westcott Chuck Co., Oneida, N. Y., scroll and drill chucks.

Westinghouse, Church, Kerr & Co., New York City, upright tandem compound engines, single action high speed compound engine, collective exhibit of steam engines, steam loops.

Wheeler Condenser Co., New York City, surface condensers.

Wickes Refrigerator Co., Chicago, Ill., tile lined refrigerator room.

Williams & Co., J. H., Brooklyn, N. Y., forgings and wrenches.

Wood & Co., R. D., Philadelphia, Pa., Camden valve and turbine wheel, hydraulic machinery, shearing, punching and riveting machinery, lifting apparatus for riveting, standard apparatus for the manufacture and use of gas.

Wood Co., W. D., Pittsburgh, Pa., iron and steel sheets and plates.

Worthington, Henry R., New York City, marine feed water heater, large check and foot valves for waterworks purposes, air compressor and beer-racking pump, Lehigh Mine pump, two central packed plunger pumps, one sinking pump, duplex plunger pump, water, oil, molasses meters, horizontal triple expansion engine, vertical compound engine, underwriters' fire pumps, low duty pumps, Admiralty feed pumps, automatic feed pumps, wrecking pump, independent jet condenser and pump, pressure pump for mining and elevator service, ammonia pump, duplex water motor, steam accumulator combined with duplex pump, general exhibit of pumping machinery.

**Y**  
Yale & Towne Mfg. Co., Stamford, Conn., differential pulley blocks, screw blocks, safety double lifts, pillar cranes, safety hoisting winches, crabs, sustaining tripods, electric traveling crane.  
Youngstown Steel Co., Youngstown, O., pig iron and washed metal.

**The Sale of Steamers to Brazil.**

The purchase by Brazil of one and probably two of the fast freight steamers of the Morgan line, with Ericsson's Destroyer, the Feiseen, built by Gardner & Mosher for Wm. B. Cogswell, which is credited with a speed of 31½ knots, and the Javelin, built by the Herreshoffs, with guns and other munitions and supplies of war, will make a very acceptable addition to our exports for this calendar year; and the attention of parties looking for fast vessels will be turned again to the shipyards of this country as a source of supply. Our ships for business, pleasure or war were long superior to those of any other nation, and now that the great disparity between the prices of iron in this country and England is being removed, we may hope to gradually assume our old position as shipbuilders for the world.

El Cid, which is the first vessel whose sale was announced, is one of five steamers, viz., El Sol, El Sud, El Norte, El Rio and El Cid, in the Morgan line of freight carriers running in connection with the Southern Pacific Railroad between New Orleans and New York. The first three are built of iron and the other two are of steel. All of these were put into commission between November, 1890, and August of this year from designs of Mr. Horace See, M. Am. Soc. C. E. Excepting El Sol, the first launched, all were built at the Newport News shipyard.

A description of El Cid, the last and fastest of the fleet, is substantially a description of all. She is 406 ft. over all, 48 ft. beam and 33 ft. 9 in. deep from deck to keel; tonnage, 4,665 gross and 2,908 net; cargo capacity, 5,000 tons; draught, loaded, 23 ft. The engines are vertical, triple expansion, surface condensing. The cylinders are 32, 52 and 84 in. in diameter with 54 in. stroke, working under 163 lbs. of steam, generated by three double-ended boilers with three corrugated furnaces in each end. The hull is lap riveted below the water line with butt joints and straps above. The propeller, which is built up, is 18 ft. in diameter, with four blades and 22 ft. 6 in. pitch. The vessel has three decks; is provided with an electric plant for search and incandescent lights, telegraph system, steam steering gear, See's noiseless ash ejectors, etc. There are five cargo ports on each side, which can be used for guns, and the deck is strong enough for 8 in. rifles.

On her maiden voyage she averaged 10½ knots an hour for the whole distances between New Orleans and New York, and made 450 knots one day. El Rio, which is supposed to be sold also, is nearly as fast as El Cid, and we believe that all of the fleet average at least 15 knots an hour.

El Cid is now having her upper deck strengthened and a circular track laid for a 43-ton dynamite gun, built by the Pneumatic Torpedo & Construction Company, which will throw a charge of 500 lbs. a little over two miles, and a 50 lb. projectile over four miles. As our Government is building all of its guns in Government shops, no 6 in. rifles are in the market, but rapid fire guns of smaller calibers can be obtained. The Feiseen and Javelin are to be fitted as torpedo boats. It is estimated that the total purchases, vessels, arms and stores, will aggregate over \$2,000,000.

It is noticeable that Mr. Huntington should have built a fleet of five freight carriers for an average speed of 17½ land miles an hour, two of which have made about 19 miles an hour, as a business transaction. It has been held by the English, who have the greatest experience in ocean freighting, that 8 to 10 knots an hour, with course greater cargo capacity, is the most economical speed. The tendency to fast freight speeds seems fully developed on the lakes also, for almost every new boat that comes out is faster than its predecessor. If Mr. Huntington replaces El Cid and El Rio with vessels of the same fast type, it will be pretty conclusive proof that these high freighting speeds are remunerative. However that may be, there is but little doubt that the sale or sales from the Morgan line due to the speed and high character of the boats has made the building of these craft a profitable enterprise.

**The Rothorn Railroad.**

The Rothorn Mountain Railroad, in Switzerland, which was given over to regular traffic a few months ago, reaches a higher altitude than any other existing railroad in that country, although, with the completion of the Mount Eiger road, now in course of construction, it will have to take second place. The latter will reach an elevation of nearly 13,000 ft. above the level of the sea, while the terminal station of the former is at an altitude of about 7,400 ft. The length of the Rothorn line is a little over 3½ miles, and the difference in elevation between the two terminals is 5,516 ft. The road passes over several bridges and through two tunnels, one of them, near the upper terminal station, being about 1,300 ft. long, and constituting one of the most striking engineering features of the whole undertaking. The road was built with a 32-in. gauge, after the Abt rack rail system, under the supervision of the Bavarian engineer, Lindner.



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**Contributions.**—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

**Advertisements.**—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

We print in another column a short review of the bond market last week. There has been a great improvement, not only in prices, but in the volume of transactions. A fact of still more significance is the resumption of the normal processes of financial accommodation. Railroads, merchants and manufacturers can again borrow money. Within the last few days railroad companies and other large corporations have been able to place securities, not only in New York, but in London, to considerable amounts; and it is through this process that an immediate and great change in the commercial and industrial situation may come, and probably will come. The beginning that has already been made is important and striking. At the moment of writing the Senate bill has not passed the House, but when it is actually signed we may expect a prompt unlocking of the great accumulations of money that have taken place, not only in the banks, but in the hands of private holders at home and abroad, and there may be a restoration of activity that will astonish everybody.

It will be observed from the abstract of the report on the improvement of the Columbia River at The Dalles, on another page, that the majority of the Board of engineers is adverse to the proposed boat railroad, although it is considered feasible with curves not to exceed 1 deg. and with a modified form of car, and the majority considers a canal a better solution, for certain economic reasons, though costing more at first. The minority, two against five, recommend a boat railroad; but every one abandons the first proposition of putting the boat railroad on the north side of the river and using 2 deg. curves. That much at least has been secured by discussion of the project; the entire impracticability of the north shore location has been shown. In fact it is a question if the whole project is not based on a fallacy. It is assumed that the river improvement is justified, as a public enterprise, to regulate railroad rates. But (1) if there is a possible traffic that would justify building a portage railroad or a boat railroad or a canal, why should it not be built by private enterprise? And (2) how long could light draught boats, of small capacity, navigating a river with a strong current, compete with an able bodied railroad running along the bank? The history of Missouri River boating might perhaps be studied with profit before the United States government is enlisted in an expenditure to create a new river navigation under even less favorable conditions.

For the proper development of a rapid transit system in the city of Chicago it appears to be necessary to connect the various elevated railroads, built and building, by a loop in the business part of the city to enable passengers to go from one place in the city to any other by a quick, and, so far as it is possible, an uninterrupted journey. This requires not only a central station from which trains on any of the roads may be taken, but such track connections that a train may

make a continuous journey over different lines. The South Side Rapid Transit road (Alley) has its northern terminus in the southeastern corner of the business part of the city and the Lake Street elevated, running to the west side, will have its eastern terminus in the northwestern corner of the same region, while the Metropolitan will have its terminus in the southwestern corner. It is a long walk from any one of these stations to any other and the two or three changes necessary on the surface cars would take more time than the walk across, to say nothing of additional fares. The need of a loop has been appreciated and various schemes for such a line have been described in the city papers. The plan under discussion now is for a line making the circuit of the business portion connecting the down town station of each elevated road with the similar stations of the others and running conveniently near to all the trunk line stations. It is proposed to use electric motors and have the passengers from the various elevated roads transferred at the junction points with transfer tickets. A great objection to this plan is the delay in transferring. It is desirable to use electric motors on the loop, and so do away with the smoke, cinders and noise of a steam locomotive; and for these reasons, too, the people would like it better if electric motors were used on the surface steam roads, as well as on all elevated roads. But it is a question whether it would not be better to use steam locomotives on the loop, if they are to be used on the other elevated roads of the city and allow the trains of each road to continue around the loop and so obviate the necessity for transfers at junction points. If the transfers become necessary the elevated roads will not do as much business as they would do with continuous trains because of the time lost in transferring. This will mean that the cable cars can serve a certain large territory as quickly as the elevated. Then, too, the jam that would take place at the junction points during the hours of heaviest traffic and the fact that, as now, the cable companies would give transfers to the cross-town horse-car and electric lines, would turn from the elevated roads much of the traffic they would get if continuous journeys could be made.

It is noticeable that most of the people killed and injured in recent collisions were riding in day coaches. The whole significance of this is not yet clear. It may be that the coaches which were so badly smashed, while cars front and back of them received but little injury, were old in design and weakened by age and service, or perhaps they were constructed on old plans which are inadequate for present railroad service. The general impression made upon the public is that the cars so badly smashed were constructed of poor material, from weak designs. This is apparent from the expressed opinion of many intelligent persons who were on the wrecked trains. If it be that the cars were old and weak, the lesson is that there is little profit in carrying a great traffic in trains of several sections with the protection to trains now common, and, further, that the loss of life and property in a collision is dependent somewhat upon the strength of the equipment, to resist shock. But, on the other hand, if the cars were comparatively new and built from well considered modern designs and specifications, then the lesson is that day coaches are not now built as strong as they should be, both from a humanitarian standpoint and from a standpoint of economy. The cost to a railroad company of any one of the recent bad collisions is greatly in excess of the total difference in cost of weak and strong car framing for an entire railroad equipment. In one case, a railroad company that operates less than one hundred passenger cars has had a collision that will cost the company something like \$500,000. Of this amount perhaps as much as \$250,000 would have been avoided if the equipment had been stronger. The cost, then, of the additional damages due to weak equipment might be as great as \$2,500 a car for the entire equipment, which is more than four times the cost of strengthening the cars to such an extent as to decrease greatly the loss of life. It is certainly very desirable that the inquiry into the causes of the great loss of life in some cars in a train in the recent accidents while few were injured in other cars which were in a more dangerous position and which must have received more shock, should be complete and exhaustive, so that the lessons of those accidents may be as useful as they are severe.

The Western Railway Club has recently had two very good papers on the rolling stock at the World's Fair. The one on Locomotives, by Mr. E. M. Herr, describes the more interesting details, and calls attention to the changes and advances in locomotive design in recent years and remarks upon the non-representative charac-

ter of the exhibit. This is a just criticism, as there is scarcely an engine from a foreign country that may be said to be of the standard designs in common use there. Of our own locomotives one can say that they are representative except in the matter of the compound cylinders. The engines are not heavier on the average than those in constant use here, and the details of construction, excepting the polish and decoration, are the same. For those who have not seen the locomotive exhibit Mr. Herr's paper will be especially valuable, and for further information the descriptive articles in the *Railroad Gazette* of June 16, 1893, and Oct. 27, 1893, may be found useful.

Mr. Gibbs' paper on Passenger Cars has been sent out without the cuts and tables giving dimensions, and also, for some unknown reason, without his name. The paper is an exceedingly interesting one, outside of the description of the cars, as it deals with practical matters pertaining to construction. What Mr. Gibbs has said about the waste of time and money in such elaborate finish as is on the cars exhibited, especially the parlor and sleeping cars, appeals to the sense and judgment of many railroad men and travelers. An embroidered silk facing for berths and panels may be in place in a private car, but to the discriminating traveler it is an ostentatious barbarism. What he wants is plain, clean, polished wood or metal that can be kept so free from dust and germs as to be hygienically safe; and, what is equally important, it should appear to be free from any contamination. Only clean, polished, hard surfaces give one confidence in freedom from bacteria and bacilli. Equally important is an increase of strength without an increase of weight. Some of the new cars at the Fair weigh about 114,000 lbs., and railroad men are asking if these are the cars which the sleeping car companies are soon to ask us to haul? In conclusion Mr. Gibbs said: "I have space but for a few of the conclusions which might be profitably drawn from the collection of cars here briefly described. As examples of perfection of the car builder's art, the trains exhibited are truly representative; as examples of the decorator's art, they have never before been equaled, and it is to be hoped will not in this respect prove representative in the near future; this latter refers especially to the Pullman and Wagner trains. These cars should have been entered in the catalogue as two separate classes of exhibits; First, as excellently designed railway equipment; second, as fine examples of the decorator's and house furnisher's art; but the latter in absurd and execrable taste in connection with the former. It has for some time become apparent to railroad men that it was time to call a halt upon the expensiveness and over-elaboration of detail found in the equipment of sleeping car companies. I have heard, however, the plea gravely advanced by men who should know better that the sleeping car companies, and not the railroads, pay for these luxuries. It seems hardly necessary to advance an argument to refute this statement, but it may be asked, Who pays for hauling the increased dead weight around the country? In the Wagner compartment car, for instance, but 12 passengers are comfortably accommodated; whereas, in the ordinary 12-section sleeper, with drawing-room, 27 will have a berth apiece. Again, it is the rule to base contracts between car and railway companies upon the net earning power of the equipment to the former, including, of course, interest charges on investment and cost of maintaining; and the higher these latter charges, the less favorable the terms to the railway companies. It is possible, however, that these companies do not intend to put their trains into regular service in exhibition order, and we will rest in that hope."

This paper has already caused a good deal of talk about the evil of too heavy and too elaborate sleeping and parlor cars, and there is evidence that at the next meeting of the Western Railway Club the discussion will be spirited.

**The Law of Time Tables.**

Two views of the status of a railroad time table are to be found in the adjudged cases; one that its publication and distribution to the public is an offer addressed to all intending passengers, which by the purchase of a ticket or the tender of the legal fare becomes an absolute contract between the carrier and the passenger; the other that it is only a representation to the public that the company's trains ordinarily run at the times stated, and that the company will use due care and diligence to carry out the representation, but that it does not import an absolute and unconditional engagement for such arrival and departure, and does not make the carrier liable for want of punctuality which is not attributable to his negligence.

The application of the first view would make the company absolutely liable, and no defense of accident or the act of God, or causes beyond the carrier's control would be admissible. For it is an elementary principle of the law of contracts that one who promises absolutely

and unconditionally is bound absolutely and unconditionally. Nevertheless this is the English rule as laid down in the celebrated case of Denton vs. The Great Northern Railway. There the time table stated that a certain train would leave London at a certain time, and arrive at other stations along the route at specified times. The plaintiff went to the station at the advertised time intending to take passage, demanded a ticket from the clerk, and tendered the price of it, but as the train had been taken off, the clerk refused to issue the ticket. In an action against the company, Lord Chief Justice Campbell said:

"It seems to me that railways would not be that benefit and accommodation to the public which we find them to be, if the representations made in their time tables are to be treated as so much waste paper, and not considered as the foundation of a contract. I think the plaintiff is entitled to recover, both on the ground that there was a contract, and also for a false representation. I think there was a binding contract, and that the case is the same as if the company should publish in express terms that if customers would come to a particular station at a particular hour a train would be passing at that hour, or near the hour, and that any person who tendered his fare should have a ticket, and be carried from that station to some other given station."

One judge dissented from the judgment of the Chief Justice, and it is to be observed that the evidence showed that the time table had been published after the train had been discontinued, and that the railroad was therefore liable, independent of any contract, for falsely representing that a train would start when it knew it would not.

The American courts, however, have refused to follow this case. Thus, in the Gordon case, in New Hampshire, the plaintiff had purchased a ticket to be carried (according to the time tables) from a way station to the terminus of the road, but the train did not stop for him, for the reason that it was unexpectedly overcrowded and ascending a grade, which, the train being heavily loaded, would have made it very difficult to start again if it had stopped at the station. He brought an action against the company, but it was held that the published time tables of the company imposed upon it no further obligation than to use due care and diligence to be punctual in its departures and arrivals, and in the carrying of its passengers according to such tables, and that the failure in this instance to carry the plaintiff, as he had been led by them to expect, not being attributable to the negligence of the company, he could not recover. The Court very properly reasoned that, if a railroad was an insurer of punctuality, it would be under a higher obligation to run punctually than to run safely; and, it being well settled that, as to safety, carriers of passengers are bound only to use care and skill, it would be absurd and against public policy to make them guarantors against loss of time at the expense of safety of life and limb.

Another reason given by the New Hampshire court was scarcely as sound: "In this country," it was said, "nearly all railroads publish time tables, and delays not attributable to negligence are not uncommon; yet suits to recover damages for detention in such cases are almost, if not quite, unknown. That such actions are almost unprecedented shows very strongly what has been understood to be the law upon the subject." The infrequency of such suits shows nothing of the kind; it shows simply that people prefer to waive their legal rights rather than elect to enforce them with all the trouble and expense of a lawsuit against powerful corporations.

In the Sears case in Massachusetts, a railroad delayed the departure of its train for about two hours after its advertised time, for the accommodation of a number of its patrons who wished to attend a performance at the theatre, and to be carried home after it was over, and a ticket-holder who went to the station to be carried at the advertised time was allowed to recover from the company his expenses in being carried to his destination in a hired conveyance. This case must be regarded as determining the true status of tickets and time tables. The ticket, the Court held, was a contract, the terms of which were to be found not only in its printed terms, but in the public advertisement of the times when the train would run, which entered into and became part of the contract. But the promise as to the running of trains was not irrevocable. Railroads find it necessary to vary the terms of running their trains, and they have a right to make these variations even as against those who have purchased tickets. The contract entered into between carrier and customer by the publication of time tables and the purchase of a ticket is subject to an implied condition that the carrier may after reasonable notice change its promise in this respect, but the notice of the change, to be sufficient,

must be either actually brought home to the passenger himself or it must be published as extensively as the original advertisement was. And as it appeared that the plaintiff had read the time table in the city newspapers, and no notice of the change had been published there, the fact that such notice had been posted up in the station and in the cars did not affect him, it not being shown that he had actual notice of the change. "If they had published a notice of the change in the newspaper, we think he would have been bound by it. For as they have a right to make changes he would be bound to take reasonable pains to inform himself whether or not a change was made."

The Court in the Sears case said that "if in their advertisement they had reserved the right to make occasional changes in the time of running a particular train, he (the passenger) would have been bound by the reservation. It would have bound all passengers who obtained their knowledge of the time tables from this source." So in an English case the time table which the Court relied on contained a clause that the company did not warrant that the trains would arrive punctually, and the Court said: "If there was any contract here, it would appear from the time bills published by the company; and if the plaintiff, whose duty it was to do so, had put in the time bill we should have seen what the real contract was, viz.: that the company do not warrant that their trains shall arrive with punctuality at the time indicated at the different stations."

The American law in regard to railroad time tables may therefore be stated to be as follows:

1. That the publication of the times and places at which trains leave and arrive are offers which become contracts upon their acceptance by any person presenting himself as an intending passenger relying on such published proposal.

2. That such offer is not unconditional, but is subject to the implied conditions (a) that if performance shall become impossible without the carrier's fault, he shall be excused, and (b) that he shall have the right to change its terms upon giving reasonable notice of such change.

3. That such notice of change, if given in the same manner as the original offer was made, need not be brought home to the passenger, but if given in a different manner it must be.

4. That the contract entered into by the purchase of a ticket is subject both to the statements made in the published time tables and to the implied conditions, 2 (a) and (b).

5. That the carrier may qualify his liability by giving notice in his time tables that he does not warrant that his trains shall arrive and depart at the precise times indicated, though such a limitation would not be construed to cover a breach which resulted from his gross negligence.

#### The Railroad Bond Market for October.

Nearly all of the railroad bonds in which there is anything like an active market show advances for the month, the highest being seven per cent and the lowest a fraction. In the accompanying table we give the range of prices, including the highest, lowest and last sale, together with the change from the lowest. By the "last" column it will be seen that the last sales are, with few exceptions, at or near the highest. This indicates that the market at present is much firmer than it was at the beginning of the month. The highest prices were reached during the week ending Saturday Oct. 28. On Monday and Tuesday of this week the reaction in the stock market depressed prices somewhat.

Last week was characterized by an unusual demand for bonds for investment. The transactions aggregated \$11,500,000 par value, in nearly a hundred distinct issues. The movement is more significant than the coincident rise in stock, inasmuch as it is less affected by speculative purchases, manipulation or momentary conditions, and shows the faith of investors in the stability of our railroads, now that the repeal of the Sherman silver law is certain.

Special influences affected the movement of certain bonds. Thus the Erie seconds are now selling at near their lowest figure for the month, owing to the default in interest Nov. 1, after having reached seven points from the lowest earlier in the month. Certain of the Union Pacific securities show weakness from the same cause. The bonds of such roads as Atchison, Missouri, Kansas & Texas, Rock Island, Texas Pacific and Northern Pacific, all reflect a better condition in railroad affairs in the West, closely following the advance in the stock market. In the last named bonds the change of management from the Villard régime to the Ives-Belmont party is responsible for the better feeling and the consequent higher prices.

The recent events in the coal world, noted in these columns last week, gave strength to coal issues, notably Reading incomes. The bonds of the Northwest, Lackawanna, St. Paul and Lake Shore were dull but strong. The sales were far apart and from two to five points

from the last sale, and generally higher. The table follows:

	High.	Low.	Last Sale.	Change fr'm low
Brooks Elev. 1st	108	106	108	+ 2
Ches. & O. con. 5's.	104 1/2	101	103 1/2	+ 2 1/2
" " gen. 4's.	75 1/2	67 1/2	74	+ 6 1/2
Ft. Worth & Denver City 1st	77 1/2	70	75	+ 5
Hock Val. 5's	89	85	89	+ 4
Iron Mt. 5's	75	68	73	+ 5
Kan. & Tex. 4's	79 1/2	75	79 1/2	+ 4 1/2
Kan. & Tex. 2d's "A"	45	38	44	+ 6
L. N. A. & C. con.	100	91 1/2	98	+ 8 1/2
" " gen.	73 1/2	64	71	+ 7
Mobile & Ohio gen.	55 1/2	50	55 1/2	+ 5 1/2
N. Y. Elev. 1st	112	109 1/2	112	+ 2 1/2
N. Y. Chie. & St. Louis 4's.	96	92	95	+ 3
Reading 1st income	37	29 1/2	35 1/2	+ 6
Reading 2d income	26	18	23 1/2	+ 5 1/2
Reading 3d income	21 1/2	15 1/2	19	+ 3 1/2
Reading gen. income 4's	71 1/2	60 1/2	70	+ 3 1/2
St. Paul & Northern Pac. 6's	109 1/2	105 1/2	109 1/2	+ 4
St. L. & Southwestern 1's	60 1/2	54	59 1/2	+ 5 1/2
Texas Pacific 1st 5's	75	68	74	+ 6
Union Elev. 1st	107 1/2	103 1/2	107 1/2	+ 1
Ore. Short Line coa.	55	47	49	+ 2
Ore. Short Line 6's	88	68	83 1/2	+ 5 1/2
Ore. Impt. 1st	96 1/2	90	96 1/2	+ 6 1/2
Ore. Impt. 5 1/2's	59 1/2	43	49 1/2	+ 6 1/2
Peo. Dec. & Ev. 2d	50	36	40	+ 1

#### September Accidents.

Our record of train accidents in September, given in this number, includes 77 collisions, 75 derailments and 6 other accidents, a total of 158 accidents, in which 79 persons were killed and 200 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS:	Rear.	But- Crossing
Trains breaking in two	13	0
Misplaced switch	0	3
Failure to give or observe signal	7	1
Mistake in giving or understanding orders	0	9
Miscellaneous	2	5
Unexplained	9	6
Total	31	24

DERAILMENTS:	But-Crossing
Broken rail	2
Loose or spread rail	2
Defective bridge	1
Defective switch	2
Defective frog	2
Broken wheel	5
Broken axle	4
Broken truck	2
Fallen brakebeam	2
Loose wheel	1
Failure of drawbar	2
Hurried brakehoose	1
Misplaced switch	3
Total	77

OTHER ACCIDENTS:	But-Crossing
Boiler explosion	2
Cylinder explosion	1
Broken side rod	1
Other causes	2
Total	5

Total number of accidents..... 158

A general classification shows:

COLLISIONS	DERAILMENTS	OTHER
Defects of road	1	9
Defects of equipment	14	17
Negligence in operating	42	17
Unforeseen obstructions	0	12
Unexplained	29	29
Total	77	75

The number of trains involved is as follows:

COLLISIONS	DERAILMENTS	OTHER
Passenger	34	22
Freight and other	109	59
Total	143	81

The number of accidents..... 158

The casualties may be divided as follows:

KILLED:	COLLISIONS	DERAILMENTS	OTHER
Employees	23	7	2
Passengers	31	4	0
Others	4	8	0
Total	58	19	2

The number of accidents..... 158

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

PASSENGERS	PASSENGERS	EMPLOYEES	EMPLOYEES
Defects of road	0	0	4
Defects of equipment	0	0	7
Negligence in operating	32	85	27
Unforeseen obstructions and malice	0	0	22
Unexplained	3	3	6
Total	35	88	101

Thirty-two accidents caused the death of one or more persons each, and 33 caused injury but not death, leaving 93 (59 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with September of the previous five years shows:

COLLISIONS	DERAILMENTS	OTHER ACCIDENTS
1893	1892	1891
1890	1889	1888
1891	1890	1890
1892	1891	1891
1893	1892	1892

EMPLOYEES	EMPLOYEES	EMPLOYEES
1893	1892	1891
1890	1889	1888
1891	1890	1890
1892	1891	1891
1893	1892	1892

ACCIDENTS	KILLED	INJURED
5.26	6.77	7.90
2.63	3.10	2.16
6.67	7.83	6.60
5.00	4.58	4.27
1.00	1.17	1.77
0.500	0.52	0.500
0.348	0.360	0.360
0.227	0.247	0.247

Average per day:

Of the 35 passengers killed in September, 29 were the victims of the three principal accidents of the month Colehour, Manteno and Kingsbury. These are already familiar to our readers. There is nothing new to say about them, as information concerning the questions on which further light is needed is thus far unobtainable. We have written to the Railroad Commissioners of Illinois, inquiring about the two collisions that occurred in that State, but have received no reply. We have also inquired of the authorities in Indiana, without result. (There is no railroad commission in that state.) We have been equally unsuccessful in getting information from the officers of the roads. In the Manteno case it is quite likely that the Cleveland, Cincinnati, Chicago & St. Louis, which employed the brakeman of the foremost train, and the Illinois Central, which employed the engineman of the second train, will disagree as to the responsibility for the collision, and that this is the reason why our quest for information is unsuccessful. We made no inquiry concerning the Colehour collision, as the officers of the Pennsylvania came out promptly with a frank statement to the effect that the careless despatcher, though young, had a good record of ten years. We do not know how acceptable this defense will be to the veteran train despatchers who lay special emphasis—and justly—on experience and mature years combined as a main qualification for the despatcher's office, but the action of the road since the collision indicates that the officers believe an additional safeguard necessary even with their best despatchers; the block system has been put in operation throughout the main line. The management of this road has heretofore held, we believe, that it was not expedient, as a rule, to attempt block signaling on single track lines.

It will always be necessary to employ despatchers as long as single track railroads are operated, and it is so obvious as to need no argument, that the best possible men should be secured even if other safeguards are provided. Unless those other safeguards afford absolute perfection it will always be important to seek the highest intelligence and conscientiousness and the best available experience in filling the office of despatcher. But with the best human skill in the despatcher's office—a difficult standard to maintain—it will always be far harder to maintain the desired standard among engineers and conductors, for the simple reason—if for no other—that there are many more men; and so the establishment of the block system is rightly demanded as a preventive of butting collisions. It might be argued that a high degree of safety to human life is attainable without it, but that is answered by the fact of the cheapness of the block system. In fact it is fair for our present argument to say that it costs nothing at all, for it is needed as a protection against rear collisions—collisions which the despatcher system does not pretend to prevent—and we need not charge any part of its cost to the butting-collision account.

One other accident in which passengers were killed afforded a peculiarly effective illustration of the need of the space interval system in running trains, that at Bellevue, Mich., on the 27th. The stations at which agents were on duty were far apart and the foremost train had to stop more frequently than the other one—a good combination, on a foggy night, to produce a collision.

The passenger killed at Grass Valley, Cal., was on a mixed train. We have classed the accident as caused by bad loading. Certainly no one could expect a circus horse to behave any better in a narrow gage car than in one of ordinary stability! The horse probably imagined that he was on the south side of the ring and braced himself accordingly, when, in fact, the car was on the north side of one of the rings of which the road is composed.

The other most notable collisions were those at Leipsic Junction, O., on the 10th; Batesville, Ind., on the 5th, and Gates, Neb., on the 7th. The bridge failure near Wallingford, Vt., on the 6th was the subject of highly sensational newspaper accounts, but we have been unable to get confirmation of the statements made concerning the malicious loosening of bolts. The derailments near Birmingham on the 22d and at Gulfport, Miss., on the 28th appear, however, to have been instances of the most devilish train wrecking.

At Cincinnati on the 3d an electric street car became uncontrollable on a steep hill and over 40 passengers were injured, five of them fatally. On the very next day there was a similar accident in the same city, injuring three more passengers. At Mauch Chunk, Pa., on the 12th, some passengers in an electric street car were badly injured by the car running away, and the Superintendent of the road was arrested on a criminal charge. Near Haverhill, Mass., on the 15th, 11 persons were injured by a butting collision of electric street cars, and at Omaha, on the 23d, a woman was killed in a crossing collision of electric street cars. In Philadelphia, on the 6th, a street car was run into by a freight train and several passengers injured.

#### Annual Reports.

**Ohio & Mississippi.**—This company reports for the year ending June 30, 1893. The road is now the property of the Baltimore & Ohio. As we have already noted, the stockholders of the Ohio & Mississippi and of the Baltimore & Ohio Southwestern, at a meeting held Oct. 23, ratified the agreement of consolidation between those

two companies, the consolidation to take effect Nov. 1. The Baltimore & Ohio owns the entire common stock of the consolidated company and guarantees the new first mortgage 4½ per cent. bonds issued to retire the old securities. The mileage operated was 635.92, the same as last year. The principal results of operation for the year under review are as follows:

Gross earnings.....	\$4,259,287	Inc. 1.67 per cent.
Operating expenses.....	3,049,933	Dec. 4.94 " "
Net earnings.....	1,249,354	Inc. 22.51 "

The ratio of operating expenses to gross earnings was 70.94 per cent. as compared with 75.88 per cent. in the preceding year. The increase in gross earnings was 2.44 per cent. in freight and 12.8 per cent. in mail and express, the passenger earnings having fallen off 1.83. The mail and express earnings were a little less than eight per cent. of all, nevertheless they contributed \$37,500 toward the final increase of \$70,884. The ton mileage increased 1.42 per cent. to nearly 275 million ton-miles. Although the ton mileage increased, the freight car miles decreased 3.97 per cent., and the average freight train load increased from 150 to 167.5 tons, or 11.65 per cent. The rate per ton per mile also increased from .911 to .919 cent. As a result of the increased loads, all of the important items of train expenses decreased, that is the wages of trainmen, and even of fuel for locomotives diminished slightly. Other items of conducting transportation increased somewhat, including an entirely new item under the head of superintendence of \$56,000, so that this element of operating expenses was a little greater than in the preceding year. Besides the saving in the items mentioned, operating expenses were less in the matter of repairs of roadway, track, bridges and buildings; so that on maintenance of way there was a saving of \$57,000 and in general expenses of \$53,000. As we have said, there was a decrease of 1.83 per cent. in passenger earnings, and yet the passenger miles increased 8.02 per cent., the total being over 72 millions. The passenger train mileage increased, but the passengers per car-mile fell off 29.85 per cent., and the rate fell from 2.2 to 2.0 cents.

Additional equipment to the amount of \$202,609 was purchased, consisting of 20 locomotives, for which \$60,000 in cash was paid, the balance payable in small monthly payments. Fifteen hundred and thirty-three feet of new steel bridges were erected, as compared with 862 feet in the preceding year. Trestles to the extent of 2,273 feet have been entirely renewed, and 29 miles of new rail was laid. No serious accidents occurred during the year, and the item of payments for personal injuries fell from \$38,000 to \$17,000.

**Chicago Great Western.**—This company reports for the year ending June 30, 1893, being its first annual report as lessee of the Chicago, St. Paul & Kansas City, of which property it has now become the owner. The mileage operated was the same as in the preceding year, namely, 922.45 miles. The results of operation were:

Gross earnings.....	\$5,083,014	Inc. 1.16 per cent.
Operating expenses.....	3,955,175	" 7.93 "
Net earnings.....	1,127,839	Dec. 20.60 "

The ratio of operating expenses was 77.81 per cent. in 1893, and 72.93 in 1892. The ton-mileage increased to 484,357,569, being 5.35 per cent., but the ton-mile rate fell from .80 to .77. Therefore, the freight earnings increased but 1.74 per cent. The passenger earnings increased 1.16 per cent., the passenger-mileage having decreased, but the rate having increased from 2.19 to 2.25. The average haul of freight was 304.9 miles, an increase of about 2 per cent. The considerable increase in operating expenses is said by the President to have been due in great measure to the heavy snows of the winter, which caused not only a direct but an indirect increase in expenses, the locomotive fuel account having increased 14.6 per cent. While it is quite true that the item of fuel increased so considerably, one finds on inspection of the detailed tables that all the other main items of cost of conducting transportation increased in about the same ratio, some of them considerably more. The item of freight-car mileage, for instance, increased 24.5 per cent. While earnings increased during the first half of the fiscal year they decreased steadily during the last half, which, of course, is not peculiar to this line.

About \$417,000 has been spent in additions and improvements, including over \$82,000 for bridges and culverts, \$49,000 for improvements in rolling stock, \$54,000 for ties and \$33,000 for new buildings. We observe that scrupulous care has been taken to charge the cost of improvements to capital account; as for instance where oak piles have replaced pine, the extra cost of the oak piles has been charged to capital. So of oak ties, capital account has been charged with the difference between the cost of oak ties and what would have been paid for pine ties had they been used. Similarly where iron rails have been replaced by steel, the difference in cost has been charged to capital account.

It is said that the reorganization in accordance with the plan of the Bondholders' Committee is practically completed. At the time of the reorganization arrangements were made to issue \$2,000,000 4 per cent. debenture stock, but the change in the financial conditions of the country prevented the sale of that stock, and a loan for £80,000 was negotiated in London on the notes of the company, pledging 4 per cent. debenture stock as security.

**Chicago & Eastern Illinois.**—This report is to June 30, 1893. The mileage operated was the same as in the

preceding year, 480 miles. The chief results of operation are as follows:

Gross earnings.....	\$4,446,939	Inc. 17.8 per cent.
Operating expenses.....	2,990,315	" 19.5 "
Net earnings.....	1,456,614	" 14.5 "

The passenger-mileage increased from 46 million to 54 million and the rate per passenger-mile from 1.58 to 1.61. The ton-mileage increased from 472 million to 581 million, but the rate fell from .61 to .59 cent. The operating expenses and taxes were 67.2 per cent. of the earnings, as against 66.3 per cent. in the preceding year. The earnings per mile of road were \$9,268, an increase over the preceding year of \$1,399. The freight train load averaged 353 tons. During the year the terminals in Chicago have increased by the purchase of a yard and freight depot worth over \$1,000,000 and an addition to the Thirty-fifth street freight yard costing over \$200,000. Within the year the road will be operated with four tracks for 9½ miles out from the Polk street station and will have double track for 113½ miles farther.

Robert J. Knott, the signalman responsible for the Long Island City collision of Aug. 26, is out of jail, the Grand Jury of Queens County having decided not to indict him, because the signalman in the preceding tower "so distracted Knott with gongs and signals on the night of the accident as to remove from him every criminality." Knott has probably been in prison long enough, and we have no complaint to make that his punishment is too mild; he probably did not realize the grave nature of the duties of a signalman, and his fault seems to have been largely one of pure ignorance; but this decision of the Grand Jury is nevertheless a shining illustration of the cross-eyed view a jury is almost sure to take when passing judgment on details of railroad operation. It was shown before the Coroner that tower No. 6 asked Knott three times (by bell) if the section was clear; and we remarked at the time that such an exhibition of impatience would tend to induce a weak man to run a risk, so as to avoid further annoyance, but we cannot see that this ought to affect the Grand Jury's action. Knott's plain instructions were to give No. 6 an affirmative response after the train had passed him, and not before, whether No. 6 repeated the question two times, or two thousand times, or for two centuries. Such a plain disregard of duty constituted an offense against the law. It would probably have been the duty of the Court to impose an extremely light sentence, owing to Knott's ignorance and the greater responsibility of his superior in appointing such an ignorant person, but so clear an offense ought to be brought to trial. The Grand Jury severely censured the railroad company, but did not indict any one. To be consistent with their argument, however, they ought to have found indictments against the man in tower No. 6, or against the officers (not named) whom they censure; that is, if the theory of criminality in such misconduct is a sound one.

The reader has noticed, doubtless, that most of the newspaper comments on the enormous travel to the World's Fair during the past month have included a rebuke to the railroads for not reducing fares earlier in the season and thus distributing the extra trains over a longer time. We have not been able to get any traffic manager to admit, even privately, that he wished he had made any of the various reductions earlier than he did; they are all very strenuous in their assertions that the people who went to the Fair in September and October had not got ready to go earlier and would not have gone at any price; but the current views of the newspapers are widely believed, whether true or not, and they have been repeated so many times that we now have the amusing announcement that the hotel keepers of Chicago—those who fitted up temporary quarters and expected to make their fortune in this one season—have combined to sue the railroads for keeping people away from the Fair! It is given out that Gen. John McNulta is the lawyer for these complainants, but the enterprising reporter, beginning with "General McNulta says," is careful not to tell anything that the General does say as to whether he has lent his name to any such scheme. If he has, we may next expect Senator Edmunds to appear as counsel for the railroads in a suit against the hotels for spoiling railroad traffic by charging \$1.25 for a twenty-cent Chicago steak. These hotel men had better follow some more hopeful lead; for instance, sue each railroad for \$10,000,000 because it has not elevated its tracks, in Chicago, or support the drummers' demand for a 100-mile ticket, at one cent a mile, good throughout North and South America for ten years.

#### NEW PUBLICATIONS.

*Report of the Proceedings of the 27th Annual Convention of the Master Car-Builders' Association, 1893.* John W. Cloud, Secretary, The Rookery, Chicago, Ill.

It is sufficient merely to announce the appearance of the Annual Report of the Master Car-Builders' Association, for all of our readers know pretty well what it is and whether or not they want it. Probably the most generally interesting single paper contained in this year's report is that on The Master Car-Builders' Couplers, although the report of the Committee on Air-Brakes is really quite as important, if not more so, and there are several other valuable documents in the year's work.

## TRADE CATALOGUES.

The A. French Spring Co., Twenty-first and Liberty streets, Pittsburgh, Pa., issue a new catalogue of elliptic and spiral springs for all classes of cars and engines, also for brake release, switch, valve and machinery springs. The catalogue also includes illustrations of various types of trucks now used for cable and electric railroads, which is a very interesting addition, besides facilitating the ordering of springs for such trucks.

Catalogue of the Aetna-Standard Iron & Steel Co., Bridgeport, O.—This is the first catalogue issued by the consolidated companies—the Aetna and the Standard. The works are now in operation, prepared to fill orders for bars, angles, sheets, plates, galvanized or corrugated iron, etc. The company is working now 1,200 men out of 1,600 normal, but reports prices very low. The company claims to have the largest capacity in the United States for iron and steel sheets, and it also has great capacity for bars, light rails, angles, tees and other shapes, as well as corrugated and plain roofing. This catalogue, which is very conveniently arranged, gives such information as a purchaser needs with regard to the product of the mills.

Sand Papering Machines. J. A. Fay & Co., West Front Street, Cincinnati, O.—This company has issued a very pretty illustrated catalogue of a patent, improved, triple-drum sand-papering machine. The machine illustrated is an 8-roll, power-feed machine, working from 24 in. to 60 in. wide, and is designed to sand-paper plane surfaces of material for many purposes. The drums are three in number, made of steel, on which the sand-paper is placed, graded according to the work to be done. Each drum has an oscillating motion across the material to prevent the formation of lines. The pamphlet contains a large number of testimonials from users of the machine. A few other machines made by the company are also illustrated—as a smoothing-planer, a mortiser, etc. The machines illustrated have been exhibited at the World's Fair where they received awards.

Railway, Steamship and Stationary Engine Appliances. By J. T. Connelly, Inventor and Patentee, of Milton, Pa. This is a beautiful catalogue, 6 x 9 in., 15 pages, which will be of interest to railroad men and to master mechanics especially. The device and taps for retreading staybolt holes from the inside of the firebox, illustrated and described, is ingenious and practical. Twenty-four railroad companies are named as references who are familiar with its use.

The special tools and devices for drilling out or removing old or broken stay bolts are equally interesting and well recommended. The radial taps for holes in long distances are now standard tools with a number of railroads. A novel way of lubricating car axles is described, and a new design of steam boiler is illustrated and explained, together with the author's lap joint. The catalogue is a sample of fine printing and engraving.

## Railroad Matters in Chicago.

*Freight Traffic.*—The decrease in the jobbing trade in general merchandise necessarily affected the outward freight traffic, and the volume of such freight carried was smaller than during either of the preceding weeks the current month. As such business pays the roads better profit than any other tonnage handled the loss will be perceptibly felt in earnings. This was to be expected, as traffic is usually light at this season of the year, but the shrinkage from the same time in former years will be less than many suppose, because the comparisons will be made with smaller averages, as was the case the early weeks in the month, and the managers of some lines are predicting that the final returns for October and opening weeks in November will show larger net earnings for their lines than for the corresponding period in 1892 and the year immediately preceding. The heads of leading manufacturing and mercantile houses are also predicting that owing to small stocks of goods now in the interior shipments from this to the close of December must necessarily be larger than during the same time last year. The same theory is also advanced by coal and lumber dealers who insist that the scant stocks of such articles in the yards of the country dealers are likely to necessitate heavier shipments the coming two months than were ever before recorded during the same time in any previous year. The head of one of the largest hard coal firms in the city said: "There is scarcely any stock of anthracite coal in the interior. Every point between Chicago and Denver where hard coal is used will want large supplies when cold weather returns, and if the coming 60 days does not witness the largest shipments ever made from here in any equal time, not excepting last winter, I shall be surprised."

The movement to be inaugurated Nov. 1 by the Western roads terminating in Chicago equalizing the division of traffic receipts with their interior connection is just and one which should have been adopted long ago. Heretofore the interior roads have been paid out of proportion to their local rates for hauling freight to points connecting with Chicago. It is claimed the change will increase the annual earnings of the Chicago roads by several millions, though the loss will fall heavily on the interior lines, and may force some of them into receivers' hands.

The receipts of the miscellaneous farm products including flour for the past week was 42,410 tons, compared with 43,663 tons the corresponding week in 1892.

The following shows the amount of flour and grain delivered at Chicago by each of the railroads mentioned the week ending Oct. 28, and the corresponding week in 1892:

	1893.		1892.	
	Flour.	Grain.	Flour.	Grain.
N. W. ....	14,618	1,258,000	38,027	1,144,000
Ill. Cent. ....	3,450	750,000	150	619,000
C., R. I. & P. ....	7,300	680,000	9,000	893,000
C. & B. & Q. ....	14,157	1,300,000	27,189	2,521,000
C. & A. ....	3,300	231,000	4,600	466,000
C. & E. Ill. ....	150	122,000	.....	170,000
C. M. & St. P. ....	18,850	394,000	20,700	621,000
Wabash. ....	1,350	235,000	2,680	286,000
C. & Gr. W. ....	12,232	283,000	26,968	379,000
A., T. & S. Fe. ....	.....	354,000	450	247,000
L. N. A. & C. ....	.....	12,500	.....	21,000
Total. ....	71,727	5,620,000	129,762	7,367,000

*Passenger Traffic.*—The passenger traffic, while scarcely up to last week, was above the expectations. The large outward business will continue through the coming fortnight, but such traffic will cut no figure in the earnings, because pay was received when the tickets were sold. In brief the roads will be working to pay a debt, and the officers will feel a sense of relief when they know the last obligation has been discharged. When asked as to the general result of the World's Fair traffic, the almost invariable reply by the general managers is: "We cannot tell, as we have not yet figured up the receipts and cost." It is evident that the majority of the lines are disappointed from a revenue standpoint. The roads which were managed with intelligent economy and escaped disaster in the shape of loss of life and damage to equipment have made a little net money if the early outlays made in anticipation of a large business are not considered, but those who suffered from accidents are out of pocket.

CHICAGO, Oct. 30, 1893.

## A Challenge to American Locomotive Builders.

Much has been said recently about a test between English and American locomotives, some of it *bona fide* and some for advertising purposes. In all discussions of a test the "Queen Empress" has been mentioned as the English representative, possibly because the Americans want to be beaten by the best. But if any American builder really desires to try his engine against an English engine the opportunity is now offered, as the following letter has been addressed to all locomotive builders who have exhibits at the Columbian Exposition:

"We, the exhibitors of the express passenger English built locomotive 'James Tolman', are desirous to have same tested against the American type of locomotives. We write to know if you are willing to have any one of your locomotives here exhibited tested against our high pressure locomotive, the 'James Tolman', about the middle of November, or such time as we are able to get out of the building. As some inducement beyond the satisfaction of ascertaining the relative merits of such engines, we will gladly deposit £1,000 with Mr. Willard Smith, Chief of Transportation Building, provided you will deposit a similar sum. The locomotive that for high speed, with heavy load and economy, does the best work, and is pronounced superior, will be the winner. Should you accept this offer, will you kindly, in order to save time, cable to Polyscope, London, Eng., saying you accept challenge, also write fully to our World's Fair address.

"Perhaps you would prefer to take part in an engine trial for merits alone (no money deposit). If so will you kindly mention this and express your views and under what conditions you would wish the trial conducted.

"We would suggest hauling a load of about 200 tons, exclusive of engine and tender, over a distance of say 200 miles, making 10 stops; the same tender to be used for both engines.

"With regard to the £1,000 won by the successful engine, we would suggest that it be devoted to some charitable or public institute."

(Signed) WESTWOOD & WINBY.

It is understood that one locomotive builder is willing to enter such a trial or test provided it can take place on an Eastern road, but is unwilling to make the test in the West, as the locomotive that would be entered against the foreign locomotive is not fitted for the Western service.

The locomotive "James Tolman" was illustrated in the *Railroad Gazette* May 19, 1893.

## The Central Railway Club.

The last meeting of this Club for 1893 was held Oct. 25, at Buffalo. The question of continuing the publication of the proceedings in pamphlet form was taken up, and it was suggested that an effort be made to secure uniformity in the size of the pamphlets of the various clubs, so that they might be bound together.

## AIR-BRAKES AND BRAKE RIGGING.

The Special Committee on this subject was unable to report, but Mr. James Howard, of New York, presented a paper on Brake Rigging. He said that the fact appears to have been lost sight of that it is the brake rigging which does the work, the air-brake apparatus proper simply furnishing the power, and that the brake rigging is not as perfect as the air apparatus. There is a disposition to use some device for automatically taking up brake slack. Mr. Howard says that no device of this sort can be made to discriminate between slack from the wear of brakeshoes and slack from loose pins and

wear in the various parts of the brake rigging. Any effective adjuster must have two positive motions, a forward and a back motion; and there appears to be but one place in which this motion is constant and inviolable, and that is in direct connection with the brake piston. It is here only that the adjustment can be made with the necessary positive motion forward and backward without the use of extra springs or other assistance to operate an automatic device. An adjuster seems to be more desirable for freight cars than for passenger cars, as the latter come oftener under direct inspection. It is possible to make an adjuster work with a spring, but there is a well grounded objection to the use of springs. There was no discussion on the question, and the Committee was discontinued.

## DRIVING BOXES AND ECCENTRICS.

Mr. Lavery, from the Special Committee on Causes and Prevention of the Heating of Driving Boxes and eccentrics, presented the following report:

Driving boxes and eccentrics heating can be traced to many direct and indirect causes that would require pages of reports to cover were it necessary. We are of the opinion, if these parts are properly designed, carefully constructed, of good material, and proper lubricants used, the causes for heating have been covered. And if proper care is taken by those having our locomotive in charge, the prevention also is given. Driving boxes and eccentrics well designed should have strength without unnecessary weight, filled with oil cellars or recesses for the lubrication of the wearing parts. Constructed true and square in order that the surface may have easy contact with one another without pinching or binding. The material should be well considered, being strong and tough to carry the weights, as well as to resist the strains to which they are submitted.

The lubricant should be of the best grade of oils sufficiently light in body to penetrate to the surfaces, and yet not run off quickly after being applied. Presuming our locomotives are equipped as herein noted, we may reasonably expect good service if attended with care by those having them in charge, and in our judgment the heating of driving boxes and eccentrics will, to a very large extent at least, be prevented.

## The Papers of the Engineering Congress.

The General Committee and Executive Committee of Engineering Societies of the Columbian Exposition have sent out a circular announcing the particulars as to the publication of its papers and discussions at the International Engineering Congress held in Chicago in August. As our readers are well aware, the number of papers is very great and many of them are valuable. These will be published under different conditions.

The papers in Division A, Civil Engineering, with the discussions on them, will appear in the monthly *Transactions* of the American Society of Civil Engineers, beginning with July and appearing in six consecutive months. These may be had for \$2 each or \$12 for the set, two volumes bound in cloth. Single papers may be had at the rate of one cent a page. For further information address F. Collingwood, Secretary Am. Soc. C. E., 127 East Twenty-third street, New York.

The papers in Division B, Mechanical Engineering, will be published by the American Society of Mechanical Engineers. Single papers may be had at the rate of five cents each unit of 16 pages or fraction thereof. The discussions will appear with the papers in the same pamphlets. The papers of the Congress will not be sold in one volume, but will form a part of the fourteenth volume of the *Transactions* of the Society, and will be sold at the usual rates of \$10 a volume. Information regarding these papers may be had of Prof. F. R. Hutton, Secretary Am. Soc. M. E., 12 West Thirty-first street, New York.

The papers in Division C and D, Mining and Metallurgical Engineering, will be published by the American Institute of Mining Engineers. Single copies may be had in pamphlet form at varying prices. Subscriptions will be received at \$10 for the two volumes containing all the papers and discussions in paper covers. Half morocco binding will be supplied at \$1 extra a volume. These volumes will not be issued until March, 1894. For information regarding these one should address Dr. R. W. Raymond, Secretary American Institute Mining Engineers, 13 Burling Slip, New York.

The papers in Division E, Engineering Education, will be printed by the Society for the Promotion of Engineering Education as its first volume of Proceedings, which will contain from 150 to 200 pages. Papers will not be sold separately. This volume will be supplied to members of the Society for 50 cents, bound in cloth, or free, bound in paper; extra copies \$1.50 and \$1 respectively. To non-members the volume will be furnished at \$2 and \$2.50 according to binding. Correspondence with regard to these papers may be addressed to Prof. J. B. Johnson, Washington University, St. Louis, or Prof. Storm Bull, University of Wisconsin, Madison Wis.

The papers in Division F, Military Engineering, are to be printed at the public printing office in Washington, but it is not known yet whether authority will be obtained for printing the discussions. These papers when printed will appear in one volume, and applications should be made for them to Major Clifton Comly, U. S. Army, New York Arsenal, Governor's Island, New York.

The papers in Division G, Marine Engineering and Naval Architecture, will be published by John Wiley & Sons, and will not be sold separately. The price for the complete proceedings will be \$10 bound in cloth, and the volume will be ready by Nov. 1.

The papers on Aerial Navigation will be published by

the American Engineer and Railroad Journal, M. N. Forney, 47 Cedar street, New York City, where further information may be had.

#### The Use of Oil to Prevent and Remove Scale in Boilers.

We have had many inquiries from different sources within the last year concerning the use of oil for the prevention and removal of scale in steam boilers, and have found nowhere a concise summing up of the information and experience on the matter. In the article which follows we have attempted to make such a summary.

A few mechanical engineers have given attention to the subject and among them is Mr. Lewis F. Lyne of the American Society of Mechanical Engineers. Mr. Lyne as early as 1887 read before the Society a paper based upon experiments by him at the Jersey City Electric Light Company's station. He has supplemented this by another paper read before the same society and published in their proceedings in Vol. X. Mr. Lyne's report is in favor of oil to remove and prevent scale. Its chief interest lies in the description of his experiments, the results reported being rather better than can be hoped for usually. Mr. Lyne is a strong advocate of the use of kerosene oil, not crude oil. His investigations reported have been confined to the practical tests upon one kind of water and are wanting in general technical information.

The information sought by a number of our correspondents may be embodied in answers to the following questions :

- (1) Does oil prevent scale ?
- (2) Will it remove scale ?
- (3) How does it prevent scale and remove it ?
- (4) How much and what kind of oil should be used ?
- (5) What other effects does oil have on the boiler ?

There is little doubt that oil does prevent certain kinds of scale in boilers if used when the boilers are first put in and its use continued. That it does prevent the formation of scale requires no explanation or mathematical or physical deductions. A practical demonstration of that fact is the exhibition of several boilers using oil with foul water that are clean and free from scale, and an equally satisfactory proof that it removes scale is demonstrated by a number of actual cases of boilers that have been covered with scale, and that after the use of oil for a time have become clean and free from scale. Nothing can prove the fact that oil removes scale better than its use, and the subsequent removal of large quantities of scale thrown down. If the testimonials of many intelligent men are to be accepted on such a question, there can be no doubt that oil does prevent and remove certain kinds of scale. Since the domiciles of these gentlemen are widespread, living and operating boilers as they do in different points of the country, the conclusion would naturally be that oil acts beneficially upon scale deposited by a great variety of waters. It is not denied, so far as the writer has been able to learn, that oil does assist in the removal and prevention of many kinds of scale, if used in proper quantities and for a reasonable time. The companies manufacturing and offering for sale machines for injecting oil into boilers offer written guarantees that their devices will remove scale, and if they do not to refund the purchase price and take back the machine at any time within three months. The specimens seen by the writer that have been removed by the use of oil are of a hard, close-grained character, resembling very much, natural carbonate and sulphate of lime.

That oil will remove every form of scale is not so well established. A scale composed of sulphate and hydrate of lime may resist the action of oil when the carbonate would yield. Boiler plants using heaters of low temperature, which precipitate only the carbonates and pass over the sulphates and hydrates into the boiler, have a much harder scale than if no heater was used at all. Such a scale might resist the action of oil.

The question as to how oil prevents or removes scale is more complicated and difficult. Mr. Lyne in his report writes about the oil disintegrating the scale, conveying thereby the impression that the scale is dissolved by the oil. Replies to inquiries of men who are using oil do not agree with this impression; in fact, the best advices are that there is neither a dissolving nor a softening of the scale but a loosening from the boiler shell and a subsequent breaking up of the scale by the action of the water in the boiler. If scale be put in kerosene oil no disintegration takes place, though heat be applied. The impression that the oil dissolves or acts chemically on the scale probably comes from the fact that mud and sediment settle among the detached pieces of scale in the bottom of the boiler, this mud and sediment being taken for dissolved scale. Doubtless the oil prevents the formation of scale by making the boiler shell greasy and by saturating the mud with oil and destroying its coherent or adhering qualities, making a mixture similar to mortar mixed with oil. The fact that the edges of the pieces are not sharp or ragged, but are to a certain extent rounded, as if a solution had been effected, is without doubt due to the movement of these pieces upon the bottom of the boiler, caused by the swash of the water. The larger pieces will be found to have sharper and more ragged edges, which would support this conclusion. Experiment and experience both tend to prove that the scale is not dissolved by the oil.

The best authorities who from experience and study are in position to know, are agreed that the action is not chemical but physical; that the power of oil to remove scale does not depend upon its chemical affinity for the scale or for its ingredients, nor its solvent properties; but upon its penetrability; upon the same property by which a nut is loosened from a rusty bolt. The opinion held is not that the oil penetrates the scale but that it finds its way in between the scale and the boiler shell; that it is vaporized and expanded; followed by water which coming in contact with the hot shell boils and breaks up the shell, which is then further broken up by the swash of the currents carrying it to the bottom of the boiler, or to the mud drum. These statements are borne out by the fact that the broken pieces found in the bottom of the boiler are of the same thickness as the scale formation of the boiler, and they are quite as hard, and also by the fact that the thinner the scale the smaller the pieces. Thicker scale if broken by the wedging effect of vapor in between the scale and shell would break in larger pieces than would thinner scale under the same wedging effect. If the scale were dissolved we should expect in different boilers that it would dissolve down to a uniform thickness before being detached from the shell. This is not the case. The action is without doubt a physical action, and if the clay and mud contained in the scale is dissolved, or washed out, it is not due to the presence of the oil, but is no more than would occur by the action of the water if no oil were present.

How much and what kind of oil should be used? This

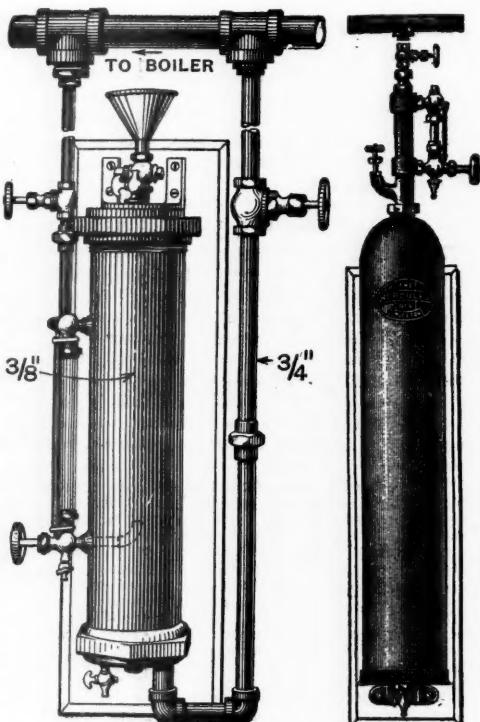


Fig. 1—Little Giant Oil Feeder.

Fig. 2—Hercules Oil Feeder.

is largely a matter of experience; crude oil has been used and with favorable results. Mr. Lyne's experience has been that the kerosene oil is much more effective and less injurious to the boiler and engines. He bases this conclusion upon experiments conducted upon two boilers under very similar conditions; in one of which he used crude petroleum and in the other kerosene. Manufacturers of oil injectors recommend the better qualities of kerosene in preference to any other oils; the better grades, because the poorer qualities are said to contain sulphuric acid, which will tend to corrode the boiler. This may account for Mr. Lyne's report of the corrosion of his safety valve when he used crude petroleum, which effects he did not have when he used kerosene oil. The quantity of oil used being so small, it is doubtful if the amount of acid contained would be sufficient to act as a corrosive unless indeed it collected and remained in the boiler.

Manufacturers of oil injectors are cautious about naming any quantity that should be used, explaining that it must depend upon the character of the scale and the kind of water used. The practice has been very wide as to the quantity used; it has been from a gallon to a half pint per day for a 100-H. P. boiler. Mr. Lyne, in his paper, recommends the use of from two quarts to three pints per day for a 100-H. P. boiler, or as he puts it, one gallon of oil every other day. The companies manufacturing oil injectors recommend that it be fed by the drop into the feed pipe, using from one-half a pint to one quart per day, depending upon the quality of the water and the thickness of the scale. The experience of all is that the best oil to use is the standard kerosene oil of good quality. The general impression among those who have used oil for some time is, that the tendency is to use too much oil rather than too little, and that after the boilers have been cleaned of their scale, a very small quantity, say a

half pint to a pint per day for a 100-H. P. boiler, is sufficient to prevent further formation of scale. The objection is not chemical but physical; that the power of oil to remove scale does not depend upon its chemical affinity for the scale or for its ingredients, nor its solvent properties; but upon its penetrability; upon the same property by which a nut is loosened from a rusty bolt. The opinion held is not that the oil penetrates the scale but that it finds its way in between the scale and the boiler shell; that it is vaporized and expanded; followed by water which coming in contact with the hot shell boils and breaks up the shell, which is then further broken up by the swash of the currents carrying it to the bottom of the boiler, or to the mud drum. These statements are borne out by the fact that the broken pieces found in the bottom of the boiler are of the same thickness as the scale formation of the boiler, and they are quite as hard, and also by the fact that the thinner the scale the smaller the pieces. Thicker scale if broken by the wedging effect of vapor in between the scale and shell would break in larger pieces than would thinner scale under the same wedging effect. If the scale were dissolved we should expect in different boilers that it would dissolve down to a uniform thickness before being detached from the shell. This is not the case. The action is without doubt a physical action, and if the clay and mud contained in the scale is dissolved, or washed out, it is not due to the presence of the oil, but is no more than would occur by the action of the water if no oil were present.

Under no circumstances should animal or vegetable oils be introduced into the boilers, for they are disintegrated and converted into stearic acids, etc., which are injurious to boiler and engine.

What are the other effects? In the discussion of Mr. Lyne's paper by members of the American Society of Mechanical Engineers some experiments were reported, bearing upon the effect of oil upon boiling point of water. The experiments as described convinced the experimenter that water with a very little oil mixed boiled at a lower temperature and more violently than did water without oil. His theory was that the oil lubricated the molecules of the water and reduced the friction between them, referring, as an illustration, to the fact that oil when poured upon water destroyed the friction between the water and the wind.

The idea that kerosene oil of low fire test when injected into the boiler rises to the top of the water and remains there, seems to have been proved untrue by Mr. Lyne's experiments described in his paper before mentioned, he having shown that, when water was heated and currents were induced, the oil circulated with it. He further proved that the oil mixed with the water by drawing water impregnated with oil from the bottom of the boiler.

Some manufacturers report having given up the use of kerosene oil for removing and preventing scale, because it neutralized the effect of their cylinder lubricant by cutting it or destroying it. The theory advanced by them is that the kerosene is converted into vapor, accompanies steam to the steam chest and cylinder, and, coming in contact with the cylinder oil, cuts it and destroys it. They claim also that if the oil is used in too large quantities, the skin formation of the valve seat, valve and piston may be destroyed, thus making the engine run hard like one just out of the shops. That this is true, the manufacturers of oil injectors do not deny, and the experience of those who have used oil in their boilers seems on the whole to bear out this conclusion. Those who advocate the use of oil say that it may be avoided by using the minimum quantity of oil that if just enough is used to prevent the scale and to remove what has already formed, it will not injure the valve seats nor destroy the cylinder oil.

This will, no doubt, be questioned, for if a considerable quantity will destroy the oil skin of a valve seat, a small quantity will neutralize a small quantity of cylinder lubricant. The oil must certainly be vaporized, and some of it pass into the cylinders. It cannot all be absorbed or retained by the mud or scale. Whether enough cylinder oil is destroyed to compare with the economy of clean boilers must be determined by practical experiment. On steamships where steam is condensed and the water used again and again, there would naturally be an accumulation of oil, which might have this destructive effect to the cylinder lubricant, and in time the collection of cylinder and coal oils, would form an oil scale, which is destructive to the boilers.

Of course oil cannot be used in boilers where the steam is to be passed through foods and wool, as for cooking or cleansing purposes. It will give an odor and taste of petroleum.

Considerable trouble has been experienced with some waters in the destruction of water-glasses, and Mr. Lyne, in his paper, reports that oil prevents this eating away or cutting of water-glasses, but that crude oil will not prevent it. In the use of oil, care should be taken to open the safety valve and to allow the escape of all gas or vapor coming from the oil before entering the boiler. Explosions have occurred when entering boilers with a light before taking this precaution.

Having discussed the use of petroleum in boilers, and its action upon scale and the plant, it is in place to describe briefly the apparatus manufactured and sold for the injection of oil into boilers. There are two machines made and sold in New York, illustrations of which are given, figs. 1 and 2. They differ only in their mechanical construction. Both feed the oil by the drop, and act upon the same principle by which lubricating oil is fed to the steam chest or cylinder of an engine. Fig. 1 has two connections to the feed pipe, fig. 2 is attached with

one, and this is the only essential difference apparent. The patent rights for the use of these sight feed injectors are in litigation, the priority of invention being disputed. Fig. 1 is called The Giant Boiler Scale Remover and Preventive, fig. 2 The Hercules Boiler Oil Injector. Fig. 1 may be more readily understood and more intelligently operated, because it is open to view. It consists of a cylindrical cistern filled with oil, the bottom of which is connected by  $\frac{1}{4}$  in. pipe with the boiler feed pipe and the top of which is connected by a  $\frac{3}{8}$ -in. pipe with the same feed pipe, but at a point nearer the boiler than is the  $\frac{1}{4}$ -in. connection. In the  $\frac{3}{8}$ -in. connection there is a glass tube in which the drops may be seen to follow one another. The instructions are to adjust the feed valve at the bottom of the glass so that a drop shall appear before the preceding drop shall have left the glass tube. The Hercules injector works on the same principle. In fact, the two machines and the instructions issued for their operations are significantly similar. The only practical difference is in their attachment, and that seems to be a matter only of cutting out a piece of feed pipe  $1\frac{1}{4}$  in. or one of 8 in., in length and threading the end cut, or of tapping one or two holes.

The injectors are filled and started same as the ordinary sight-feed lubricators. The globe valve is closed which shuts off the water connection, and the feed valve is also closed. The plug at top is opened and the pet-cock at the bottom of cistern opened to draw off water and oil. The pet-cock at bottom is then closed and the cistern filled through the plug or funnel at the top. The plug is then replaced and the injector started by opening the globe valve and the feed valve at the bottom of the glass tube.

Both companies offering these machines to the public not only claim, but guarantee, that they will clean and keep clean any boiler, no matter what kind of water is used, that they will not foam boilers or start joints, and that they will not injure the boiler or its connections and that they will stop pitting. The dangers, if there be such, have been pointed out under the effects, and the readers of the *Railroad Gazette* who adopt oil as a means to remove or prevent scale may do well to make such inspections as will satisfy them that no such injurious effects, as are suggested, result.

#### TECHNICAL.

##### Manufacturing and Business.

The Marble Coupler Company has filed articles of incorporation in New Jersey, with a capital stock of \$100,000. The directors are: James E. Marble, of New York; William H. Forsyth, of New Haven; James W. Fuller, of Albany, and DeWitt C. Morrell, of New York.

The Consolidated Car Heating Co., Albany, N. Y., has received World's Fair awards upon the following devices: (1) The Sewall steam coupler; (2) multiple circuit, hot water system; (3) improved commingler, hot water system, and (4) direct steam system.

The La Burt Automatic Car Coupler Company has removed its offices to Room 903, Havemeyer Building, New York.

At a meeting of the stockholders of the Northwestern Equipment Co. held Oct. 16 the following directors were elected: Edward J. Frost, Charles W. McCorkle and Heber R. Bishop, Jr. The directors elected E. J. Frost, previously Vice-President and General Manager, President of the company, and C. W. McCorkle, Secretary and Treasurer. The chief office is in the Monadnock Building, Chicago.

The Indiana Car & Foundry Co., of Indianapolis, is now fairly busy on repair work, and has been employing about 150 men. The company expects to soon be in the field for new freight car work, the growing importance of Indianapolis as a railroad center giving a good opportunity to secure profitable orders.

The Boile iron wrought center steel-tired wheels have been ordered for the 15 new passenger cars of the Jacksonville, St. Augustine & Indian River road, for which the contract was awarded this month to the Jackson & Sharpe Co., of Wilmington, Del.

##### Iron and Steel.

Work has been resumed in the south mill of the Lackawanna Iron & Steel Co., at Scranton, on an order for 700 tons rails. About 800 hands are employed.

The report that the Carnegie company has bought the control of the Lackawanna Iron & Steel Co. is emphatically denied by the officers of the latter company. No negotiations to that end are under way.

On Nov. 15 application will be made at Harrisburg, Pa., for a charter for the Emporium Steel Co., of Emporium. The officers are: President, J. Pitt Felt; Vice-President, Hon. S. S. Smith; Treasurer, John D. Logan; Secretary, L. K. Huntington; Superintendent, R. L. Watters.

##### New Stations and Shops.

The Philadelphia Traction Co. has placed the order for a new power house with the Berlin Iron Bridge Co. The side walls will be of brick and the roof will be of iron. The building is 190 ft. in width and 168 ft. in length, divided into boiler-room, engine-room and dynamo-room.

Gratton & Jennings, of Buffalo, have completed the

work on the buildings for the Union car shops at Depew, the new railroad town near Buffalo, and have turned them over to the company, of which H. H. Hewitt is General Manager. J. J. Albright, President of the Depew Improvement Co., is President of the car company also.

The new works of the Gould Car Co., at Depew, have been completed, and on Oct. 23 the engines were started and the first iron poured, a number of the officers of the company being present to see this formal starting.

The building of the National Switch & Signal Co. at Odenweldertown, Pa., is now under roof.

The long projected removal of the car works of the Litchfield Car & Machine Co. to Memphis, Tenn., has been decided upon, and a new company called the Memphis Car & Foundry Works has been organized to build the new works at Memphis. The car company has secured a site of 50 acres at Binghamton, a suburb of Memphis, and the land company which gives the site also agrees to grant \$125,000 in cash and make sanitary improvements at a cost of \$25,000. The plans for the buildings are now being prepared. The car company agrees to establish a plant with a capacity for turning out 15 freight cars a day, the company to have a paid-in capital of at least \$600,000.

##### The New York & New Jersey Bridge.

Last week we announced that the New York & New Jersey Bridge bill had passed the House of Representatives. Tuesday of this week it passed the Senate. A synopsis of the bill will be found in last week's issue.

##### Frost Dry Carburetor Car Lighting System.

All the postal cars on the Pennsylvania railroad are being equipped with the Frost dry carburetor system of car lighting. This is in addition to all the passenger, baggage and express cars of the company.

##### Electric Heaters for Street Cars.

The electric heating of trolley street cars has become an important branch of the business of the Consolidated Car Heating Co., of Albany. Such electric heaters with regulating switch have been applied already to cars in 29 cities and towns throughout the United States and Canada. From the Union Railway, New York, has recently been received a third order, and from the Albany railway a fourth order for such equipments. The Union Railway, New York City, and the Albany railway have all their cars now equipped with electric heaters.

##### Tests of Projectiles.

A recent test of heavy armor-piercing shells was made at the Sandy Hook proving grounds, which should have been satisfactory to the Midvale Steel Company, who are under contract to furnish the Government 325 eight-inch and 450 ten-inch shells; these tests were of the second lot delivered. Two eight-inch and two 10-inch shells were selected and each one passed through the plate, 24 inches of oak planking and into or through the sand mound or backing. One was lost out at sea. The three projectiles secured were found to be uninjured, even retaining the sharp apex unblunted. The armor plates were 9-inch and 11 $\frac{1}{2}$ -inch, made of open hearth steel, oil tempered and annealed. An 8-inch shell, 28 inches long, weighing 300 pounds, costs \$140, and a 10-inch shell, 35 inches long, 575-pound weight costs \$287—nearly 50 cents a pound.

##### The Minnesota Canal.

The Minnesota Canal Co., organized to build a water power canal to supply the cities of Duluth and Superior with water power from the upper St. Louis River, has arranged for the needed machinery, and expects, unless plans miscarry, to do a large quantity of excavating this winter. It has one cut 70 ft. deep, and with 1,000,000 yards to be moved, and it hopes to put 10 steam excavators with the necessary locomotives and flat cars at work early in the winter on this cutting. The company claims to be able to furnish almost unlimited water power at a charge of \$10 per horse per year, and it has conditional contracts for 6,000 to 8,000 H. P. already. If its projects carry it will be one of the leading power distributors and manufacturing factors of the United States.

##### Mallet Duplex Compound Locomotives.

The six duplex compound locomotives built in 1891 by J. A. Maffei, of Munich, for the Swiss Central Railroad, and illustrated in the *Railroad Gazette* of May 5, 1893, have, as already noted, given such satisfaction as to warrant the company in giving an order for 10 more engines of the same type. The railroad company now reports that after two years' service no repairs have been found necessary on parts peculiar to the system, and no increase in repairs due to the greater number of parts. The engines were first used between Sissach and Otten on grades as high as 2.7 per cent., and through the Hanenstein tunnel, 1 $\frac{1}{2}$  miles long. The engines are no longer restricted to this section, but are used in general freight service on all lines of the company, and show a saving in fuel of 15 to 22 per cent. over engines of the ordinary type with three axles coupled.

##### Gas Motors for Street Car Service.

The North Chicago Street Railway Company has been experimenting for some time with motors of different kinds to replace horses on street cars in that part of the north

side of the city of Chicago which is not served by cable lines. Gas motors have been in operation on Garfield and Racine avenues and Centre street until the property holders say the motors have proved themselves "intolerable nuisances," "constant menaces to life and limb," and as emitting an "unbearable stench." It is claimed that they frighten horses and that pedestrians are not safe on these streets. The property owners have filed a petition with the Council stating that the motors are a nuisance and asking that the Council take such action as will insure prompt abolition of the nuisance.

##### The "Brazil" Turnbuckle Decision.

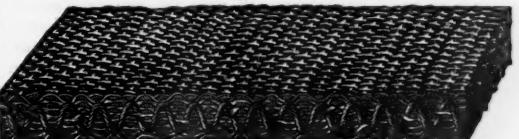
The long litigation between the Central Iron & Steel Company, of Brazil, Ind., and the Cleveland City Forge & Iron Company *et al.* has finally been decided by the U. S. Circuit Court of Indiana in favor of the former company, and the Cleveland City Forge & Iron Company and all persons or corporations acting by their authority are restrained and enjoined from manufacturing or selling the celebrated "Brazil" wrought iron, open, hexagonal turnbuckle. This suit was begun in 1889, and the decision gives to the Central Iron & Steel Company the exclusive right and title to sell and manufacture this turnbuckle. The merits of the turnbuckle and its value in the eyes of the contestants could not be better exemplified than by the expensive litigation that these companies have resorted to and prosecuted to maintain their rights to manufacture it. It has also received the only award for turnbuckles at the World's Columbian Exposition.

##### New Contracts on the Chicago Canal.

In the last issue of the *Railroad Gazette* it was stated that the contracts of McArthur Bros., on Sections 2, 3 and 4 of the Chicago Main Drainage Canal, had been canceled, new specifications drawn up, and that the Drainage Board was receiving new bids for the work on these three sections. Since that writing the contracts for the three sections have been relet. Section 3 was awarded to Gilman & McNeil, of Marshalltown, Ia., at 56 cents for glacial drift and 70 cents per cubic yard for solid rock. The other two sections were relet to McArthur Bros. The rates per cubic yard on Section 2 will be 50 cents for glacial drift and 80 cents for rock, the first contract being at the rate of 23 cents and 91 cents respectively; and on Section 4 the rates will be 49 cents for glacial drift and 50 cents for rock, the first contract being at 27 cents and 86 respectively on this section. The new prices are greatly in favor of the contractors, for it is claimed that, instead of the hard clay representing 50 per cent. of the excavations, it represents only 25 per cent.; as the price for excavating glacial drift was greatly increased and that for solid rock decreased, the contractors are the ones benefited and it is expected they will now make a handsome profit. In regard to reimbursing McArthur Brothers for the work done by them on Section 3 and for extras on the three sections, the Committee on Engineering and Finance recommended that the contractors be allowed the extras and that they be paid for the work done by them in clearing and grubbing Section 3. Had this same course been pursued by the Drainage Board last June, when the differences with the contractors first occurred, a commission of experts might have been appointed and a fair price could have been determined upon for removing the hard clay. This cemented clay mixed with broken stone was mentioned in last week's issue of the *Railroad Gazette* as being too hard for excavation by steam shovels, and on this account the contractors claimed compensation at the rate allowed for excavating solid rock. On appointment of the commission of experts the contractors could have proceeded with the work and the entire summer would not have been wasted, as it has been.

##### Maddox Cotton and Wire Belting.

The Maddox Wire Belting Co. has lately introduced belting made of cotton, very closely woven, and containing, as a core, numerous strands of steel wire cable. Each cable is composed of six wires, twisted and they are placed in the body of the belt, about  $\frac{1}{8}$  in. apart and completely covered, out of sight. The cables compose about  $\frac{1}{2}$  of the warp and are interwoven with the cotton yarn composing the rest. It



is claimed that this belting is stronger and better than the best oak tanned double leather, is not affected by water, grease, dirt, etc., and is less liable to slip than leather. The prices are about the same as those of single leather belting. All sizes more than four inches wide are about as thick as double leather belting of the same width.

##### More Block Signaling.

The Hall Signal Co. on Oct. 27 closed a contract with the Chicago & Northwestern to equip 11 miles more of double track with the Hall automatic electric block signal. This will make over 100 miles of double track on this road with continuous blocking on the Hall system.

**A Tunnel in India.**

The Panir Tunnel, on the Mushkaf-Bolan Railway, pierces the precipitous range which separates the Mushkaf from the Bolan Valley. It is for a double track of the standard 5 ft. 6 in. gauge, and is 3,050 ft. in length. The headings in this tunnel successfully met on Aug. 21. To those unacquainted with the Lower Bolan it is difficult to give any idea of the heat in the headings between March 31 and Aug. 21. The heading was begun by hand labor at the north end on Nov. 20, 1892, and machines were got to work at both ends on Jan. 4. There are no shafts. The progress over the whole period works out to an average of 13 lin. ft. a day. The best month's progress was 455 lin. ft.

The highest temperature in the shade outside the tunnel was 217 deg. F.; at night the temperature fell to 104 deg. F. In the heading itself the temperature was kept down to 100 deg. F.; under the most favorable circumstances it never fell below 92 deg. F. The above temperatures are those of damp heat, it must be remembered. As much ventilation as possible was secured by means of compressed air.

The machines used were 4-in. Climax, driven by compressed air. Two 4-in. Climax machines, each making 300 percussions per minute under 60 lbs. pressure, were used on one stretcher bar and drilled 25 holes, 4 ft. deep, in the face of the heading in five hours. No drill carriages were used; 1½-in. to 1¾-in. drills were used. The explosives used were dynamite and gelignite. There were four air-compressing engines, 14-in. cylinder and 24-in. stroke, with four 20-H. P. boilers. These were all stationed at the mouth of the gorge and 1,600 ft. distant from the tunnel entrance on the north or Bolan side.

An air-pipe of 4½-in. diameter, wrought iron tubing was taken over the hill a height of 1,000 ft. above tunnel formation level and was 6,100 ft. in length to the south face of the tunnel. Although this length of piping was laid over precipitous and rough ground and uncovered throughout its length it worked without a hitch, and a pressure of 50 lbs. was maintained in the pipe line for working the machines in its south heading.

Water is conveyed to the engine house in a pipe line seven miles in length. The temperature of the water for the last five months has never fallen below 112 deg. F. As water at this temperature was almost useless for cooling the cylinders of the air compressors, the air receivers were lapped with old manilla rope and grass and kept wet enough to have constant evaporation.

The system of construction is the Belgian; a top heading enlarged for the arch and ultimately underpinning the arch was necessary. The arch is semi-circular and is 29 ft. 6 in. span. Height from rail level to intrados of arch is 20 ft. 9 in., or 22 ft. 3 in. from formation level.

**The Simplon Tunnel.**

We noted in our issue of Oct. 20, page 767, the fact that an arrangement had been made for the construction of the Simplon Tunnel. A few more particulars are now at hand. The directory of the Jura-Simplon Railroad, the houses of Brandt, Brandau & Co., of Hamburg; of Locher & Co., of Zurich, and of Sulzer & Bros., of Winterthur, and the Bank of Winterthur, have formed a company to build the tunnel under the name of the Simplon Tunnel Company Société d'entreprise du tunnel du Simplon. The company undertakes to have the tunnel ready for operation in five years and a half from the beginning of the work, as we have already stated, the tunnel to be built for one track, and agrees to construct a side gallery to be enlarged for a second track, if required. The general conditions follow: The Jura-Simplon Railroad Company will pay the Tunnel Company, for certain plant to be installed at the northern and southern entrances which will remain the property of the company, the sum of 7,000,000 francs; for the first tunnel 47,500,000 francs including the lateral gallery; for the second tunnel, if built, excepting ballast and superstructure, 15,000,000 francs, making the total for the two tunnels 69,500,000 francs. Within four years after the beginning of the work the railroad company will decide whether or not to build the second tunnel. The company also undertakes to build an approach line at the northern end for the sum of 4,325,000 francs, which makes the first subvention (excepting the second tunnel) 58,825,000 francs. In case the enlargement is made for the second track the Jura-Simplon Company will have an additional expenditure of 1,220,000 francs, making the grand total, including interest and sinking fund provisions, 82,000,000 francs. All of this, however, does not include the southern approach line which it is hoped will be built by Italy. The plans of construction must be examined by the two governments, Switzerland and Italy, and it is only after their approval that the actual process of raising money to do the work can be begun.

**Electrical Machinery for Niagara Falls.**

The Cataract Construction Co. has awarded to the Westinghouse Electric & Manufacturing Co. a contract for a large amount of electrical machinery. The Tesla multiphase system will be used, the two-phase plan being adopted. The contract calls for three generators of 5,000 H. P. each, with motors and other equipment. The weight of the shafts, turbines and armatures is carried by the upward pressure of the water columns. The electromotive force generated will be from 2,000 to 2,400 volts, step-up and reducing transformers being used for

long-distance transmission and distribution. Work on the apparatus has already been begun. It is announced, furthermore, and denied, that the trials by the Westinghouse Co. of electric towing on the Erie Canal will begin this week near Rochester.

**THE SCRAP HEAP.****Notes.**

At Clayton, Mo., last week, two train robbers, Pinnock and Ray, were sentenced to 14 years' imprisonment.

A car repair shop of the Boston & Maine at East Cambridge, Mass., was burned Oct. 23 with several freight cars; loss \$20,000.

A bill for the establishment of a government telegraph line has once more been introduced in Congress, this time by Senator Butler, of South Carolina.

Three dollars is the amount of the fine which, according to Buffalo paper, is to be assessed against each brakeman on the Western New York & Pennsylvania who spoils a wheel by keeping the brakes set too long at a time in descending long grades.

D. G. Ramsey, Grand Chief of the Order of Railway Telegraphers, has been indicted by the Grand Jury of Linn County, Ia., on the charge of instigating the cutting and crossing of wires and otherwise obstructing the telegraph system of the Burlington, Cedar Rapids & Northern Railway during the telegraphers' strike in September, 1892.

A man has been arrested at Chicago for selling forged passes over the Atchison, Topeka & Santa Fe. It is said that a hundred such passes have been taken up by conductors. Considerable pains had been taken to get up a pass imitating the genuine in paper, style, engraving, etc., but there was no difficulty in detecting the counterfeit when it was compared with the genuine.

Mayor Matthews, of Boston, has delivered an address opposing the scheme for an elevated railroad in that city, which is to be voted upon by the citizens at the next election. The Mayor's investigations lead him to estimate the probable cost at \$17,000,000, which is nearly twice the amount which the state law, authorizing the construction of the proposed road, allows the city to spend.

A derailment injuring 13 passengers occurred on the Indiana & Illinois Southern road, near Effingham, Ill., last week, which is said to have been due to the running of the train at too high a speed on very poor track. The Illinois Railroad Commissioners are investigating the causes of the derailment, and it is said that the road has disregarded an order heretofore given by the Commissioners restricting the speed of trains.

The Kentucky Court of Appeals has held that the Hewitt act repealed the act of 1884 allowing railroads exemption from taxes five years from the beginning of their construction, but also holds that railroads which were begun before the Hewitt act was passed can still claim the exemption. This decision is expected to put about \$300,000 into the state treasury this year, and it also affects the county taxes of the railroads involved.

The Chicago, Milwaukee & St. Paul has restored the salaries of general office clerks and other employees who suffered a reduction of 10 per cent. on Aug. 1. The receivers of the Toledo, St. Louis & Kansas City have reduced the pay of employees 10 per cent., to take effect Nov. 1. The Quincy, Omaha & Kansas City has made a general reduction of wages amounting to about 10 per cent. A similar reduction went into effect on the Mobile & Ohio on Nov. 1.

A Pittsburgh paper reports that there are 25 cases of typhoid fever among the employees of the Pennsylvania road in the Pittsburgh district of the relief department. Some of the patients are passenger car cleaners, and it is stated, in an indirect way, that the disease was probably caused by impurities in water drunk from the tanks in the cars, but there seems to be no evidence of this; and it is stated in the same item that there are a great many cases of typhoid in the hospitals of Pittsburgh.

Michael Galvin and Wm. W. Tyler have brought suit against the Louisville, New Albany & Chicago road for \$100,000 for failing to carry out a contract regarding World's Fair passengers. It is claimed that the road agreed to hand over passengers to a lake line owned by complainants. The road was to hand over passengers at Michigan City, and the steamboat line was to carry them to Chicago and back for \$1 each. The passenger agent with whom the agreement was made was succeeded by another, who refused to carry it out, to the great loss of the steamboatmen.

Corporation Counsel Kraus, of Chicago, has begun ejectment proceedings against the Chicago & Western Indians and the roads that use its tracks and terminal. The bill asks the court to eject the defendant companies from their present occupancy on Dearborn street and from the entire roadway of the main line of the Chicago & Western Indiana. It is alleged that the company has been encroaching without warrant on Dearborn street south of the Dearborn station. It is alleged furthermore that the use of Wallace street and Stewart avenue

in the town of Lake is illegal. The railroad companies are inclined to look on the proceedings as an effort to coerce them to acquiesce in the city's plan of track elevation.

**Elevated Sidewalks.**

The great crowding in the streets of Chicago during the past six weeks has brought up again the question of raising the sidewalks one story, in order to give the vehicles a chance to get about without the great delays now common. The streets of Chicago are wide and the movement of people must be enormous when streets of such width are crowded as they are now, but as this crowding is only temporary it is doubtful if the elevated sidewalk scheme reaches a practical trial for some time to come.

**World's Fair Buildings and Plant.**

No satisfactory disposition of the buildings in Jackson Park has yet been made. The only offer of an outright purchase has been made by the House Wrecking Co., which was so low that the commissioners do not wish to accept. The following are the figures bid on the buildings, the company to retain all the material:

	Cost.
Manufactures .....	\$25,000
Government .....	20,000
Electricity .....	15,000
Transportation .....	10,000
Machinery .....	5,000
Fisheries .....	15,000
	 \$90,000
	\$4,477,580

Quite a number of suggestions have been made to allow some of the buildings to remain permanently in Jackson Park, but no definite action has been taken as yet. Without orders to the contrary all the electric lighting systems of the World's Fair, except what may be needed in the Administration and Service buildings and for patrol duty in the main buildings, was to be shut off after Oct. 30, for as yet no action has been taken by the authorities. The contract with the Westinghouse people expires then, and they will begin the immediate removal of their machinery unless their contract is extended. The contracts of the Allis, McIntosh & Seymour, Buckeye and Frazer & Chalmers for furnishing power for incandescent lighting also expire on Oct. 30. The arc light plant belongs to the Exposition company under rental agreement, and will be kept in operation as long as necessary. No light will be furnished exhibitors for work at night. Exhibitors are complaining because the shutting off lights limits their work to eight hours a day, but the Fair management say that exhibits can be packed faster at the rate of eight hours work a day than they can be shipped.

**Taking an Underhanded Advantage.**

Traffic on the Amboy Division of the Pennsylvania Railroad was interrupted between Riverton and Camden Thursday afternoon. A boat got caught under the bridge over Pensauken Creek, and as the tide rose lifted the structure off its foundations.—Philadelphia Record.

**The Lake Street Elevated Railroad.**

The Lake Street Elevated Railroad of Chicago is having its share of difficulties. Its legal matters having been somewhat loosely handled during the early stages of its existence it now finds itself especially liable to complications. A number of property owners lately appeared against the company with the claim that the promoters of the road did not, as is required by law, obtain the consent of the holders of a majority of the frontage, and on their representations quo warranto proceedings have been instituted against the company by the State's Attorney. In support of their allegations the antagonists of the road introduce affidavits from property holders along the line who claim that the operation of the road would greatly damage their business, also the testimony of a local surveyor by whose figures it is expected to show that the consent of the required number of holders of property along the line was not secured. On the other hand there appear a large number of residents of the West Side who demand the early operation of the road and set forth the claims that additional means of transportation are badly needed, that the capacity of the present facilities is entirely inadequate and that the projected improvements of the West Chicago Street Railway Company do not promise sufficient relief. They also allege that a number of those whose affidavits are presented are interested directly or indirectly in the success of the present street railway system, that the surveyor whose report is introduced is a paid employee of the Yerkes system of street railways, and do not hesitate to affirm that the proceedings against the elevated road are instigated by the cable road management. At a mass meeting held on the evening of Oct. 14 a set of resolutions were adopted, embodying the ideas of those in favor of the road, and requesting that the Attorney-General of the state dismiss the proceedings. A petition was also drawn up for presentation to Judge Bretano, asking that action be discontinued in the matter. It seems to be the general belief that the machinery of the State's Attorney's office is being used against the road by a rival corporation, and that the suit will be dismissed.

**The North German Lloyd.**

This company is now building six new steamers, an unusual number for any one company to have in course of construction at the same time. The largest of them are two twin screw steamers for the Imperial mail line to China of 6,500 tons capacity each, two twin-screw freight and steerable passenger steamers for the Roland Freight Line to New York of 38,000 tons, and two smaller steamers for the South American Line to the River Plate. The tonnage of the North German Lloyd now exceeds that of any other steamship company in the world. Including the vessels now building it amounts to 230,567 tons, or about 10,000 more than the next largest steamship company, the Peninsula & Oriental, and more than double that of the Cunard Line. The company now operates 18 distinct lines and owns 78 ocean steamships. In 1892 the North German Lloyd Company carried 203,408 passengers, 20,049 of whom were cabin passengers. The Cunard Steamship Company carried the next largest number of cabin passengers, some 16,005 in number. The Lloyds landed in the ports of New York and Baltimore 117,016 steerage passengers, the Hamburg-American Packet Company being next with 61,738 to their credit—about one-half the number. In 1892 the Lloyd steamships sailed 2,840,824 miles, a distance equal to 131 times around the globe. The marvelous growth of this company is best shown by some statistics. Its total tonnage in 1858 was 15,255 tons, it is now 230,567 tons; the number of passengers carried in 1858 was 1,870; last year it was 203,408; in 1858 the total mileage was 28,520, in 1892 it was 2,840,824. In 35 years

the tonnage has increased 15 fold, the passenger traffic 100 fold and the mileage 100 fold.

A very interesting report of the company is that of receipts and expenditures.

The receipts Oct. 73 to Dec. '93 are given as 2,592,855 marks. The expenditures for the same period..... 794,482

Leaving a reserve fund of..... 1,798,373 "

A very profitable undertaking is this ocean steamship business; even the carriage of steerage passengers. The company employs about 10,000 persons, not including those employed in their agencies in almost every city in the world.

#### CAR BUILDING.

The Florida Central & Peninsula has let the contract for 14 cabooses to the St. Charles Car Co.

The Illinois Central has let 147 box cars of 80,000 lbs. capacity to the Pullman Car Co., equipped with wooden brakebeams and hand brakes.

The Mount Vernon Car Mfg. Co., of Mount Vernon, Ill., has just secured a contract for 250 60,000-lb. capacity coal cars from the Louisville, Evansville & St. Louis.

The South Baltimore Car Works were reopened this week by the Receivers, Mayor Latrobe, of Baltimore, and Charles T. Crane. It is stated that the company has a number of contracts for cars, and that it will soon be employing 700 men.

Armour & Co. have let 100 refrigerator cars to the Wells & French Co., and the firm of Armour & Co., of Kansas City, have let 100 refrigerator cars to the Missouri Car & Foundry Co. Both lots of cars will have wooden brakebeams.

#### BRIDGE BUILDING.

**Brunswick, Md.**—Oct. 28 the new bridge over the Potomac, connecting the towns of Brunswick and Lovettsville, was formally opened by a celebration which attracted 5,000 people. The bridge was built of iron by the Youngstown Bridge Co., and cost \$40,000. Work was commenced June 26 last and practically completed Oct. 16. It is composed of ten spans, each of 171 ft., or an aggregate length of 1,710 ft.

**Columbia, Pa.**—Cofrode & Saylor, of Pottstown, will build an iron bridge over Chickies Creek, for the Columbia & Donegal Electric Railroad. The structure will rest on piles driven into the bed of the creek.

**Galeton, Pa.**—The contract for the masonry work of a new bridge to span the West Branch near this place has been let to C. N. Butts.

**Havana, N. Y.**—The Shepard Bridge Works, at Havana, has received contracts for building iron bridges at Coal Point, North Hector and a hoist bridge at Syracuse. The bridge at Coal Point, to replace an old wooden one, will be 60 ft. long, with 14 ft. roadway. The North Hector bridge will have a 120 ft. span.

**Manchester, N. H.**—Mayor Knowlton has authorized the Street Commission to procure plans and specifications for a new bridge on South Main street across the Piscataquog River. The bridge will be 50 ft. in width. The Street Commissioners will receive proposals.

**Norwood, Man.**—The Norwood bridge, which is now open for traffic, is a substantial structure. The steel superstructure was made by the Dominion Bridge Co., Montreal. The bridge consists of three spans of about 140 ft. each, and a draw span of about 250 ft. The whole length of the bridge and approaches is about 800 ft. The roadway is 20 ft. clear, and the sidewalks are each 6 ft. wide.

**Ottawa, Ont.**—No arrangement has been reached between the City Council and the promoters of the scheme for bridging the Ottawa River at this point. The Engineer of the Pontiac & Pacific Junction says that the estimated cost is \$700,000. In laying his scheme before the City Council, Mr. W. D. Harris, the Chief Engineer, said the bridge would have six spans and five piers, and there would be a wagon roadway and sidewalks on either side. It would have to be 45 ft. above high water mark. The main channel span would be 500 ft. The charter under which the bridge would be built allowed the company until next July to commence the work, and until July, 1897, to finish it.

The Gatineau Bridge Committee met last week and appointed Mr. Frank Hibard, of this city, engineer for the work. Construction is likely to commence immediately.

**Red Wing, Minn.**—The City Council has decided to vote \$75,000 in bonds bearing five per cent. interest for the purpose of building a wagon bridge across the Mississippi River. This conclusion defeats the plan for building combination rail road and wagon bridge.

**Warren, Pa.**—The contract for the ironwork on the new bridge at Glade will soon be let.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Carriage of Goods and Injuries to Property.

The Court of Appeals of Kentucky lays it down that a contract limiting the value of goods beyond which the carrier is not to be liable to the owner is not enforceable; where the loss is occasioned by the carrier's negligence or that of its servants, where no fraud or deception has been practiced by the owner in fixing the value, and where there has been no reduction in freight in consideration of the limitation of liability.<sup>1</sup>

In New York, a contract for the transportation of a horse recited that the company transported livestock at certain prices, "carrier's risk," and at reduced prices on certain risks being assumed by the shipper, and then provided that in consideration of the company transporting one horse, valued at not exceeding \$100, it was agreed that, in the event of loss "from causes which would make the carrier liable," its liability should not exceed such valuation. The Court of Appeals holds that the recovery of the shipper for the killing of the horse through the company's negligence, from liability for which the contract did not give exemption, was limited to the amount named in the contract.<sup>2</sup>

In Texas a joint through-rate freight tariff issued and posted by defendant and other railroad companies showed that on goods of a certain class consigned from San Francisco to the City of Mexico, via El Paso, Tex., the charges were \$2 per 100 lbs., and the proportional rate to the latter place was 90 cents, while the local rate from San Francisco to El Paso was \$1.70 on the same class. The Supreme Court decides that where the

same goods were consigned from San Francisco to the City of Mexico over defendant's road and sequestered by the owner at El Paso, the former was entitled to receive as charges only 90 cents per 100 lbs.<sup>3</sup>

In Virginia the plaintiff shipped cattle over a railroad to a point on another line, the bill of lading providing that he should load, unload and transfer them at his own cost. At a point on defendant's line the cattle were unloaded and fed and reloaded by defendant, though plaintiff was present and willing to do so, and in reloading, some of plaintiff's cattle were placed in the cars of another shipper. The Supreme Court of Appeals holds that the mistake was defendant's, and it is liable for any loss sustained by plaintiff, though such loss occurred on the line of the connecting carrier; since it was the result of its own negligent act committed before the cattle were delivered to the connecting carrier.<sup>4</sup>

##### Injuries to Passengers, Employees and Strangers.

In South Carolina the Supreme Court holds that under a statute providing that railroad companies shall cause all their trains for passengers to entirely stop, at all their stations advertised as stations for receiving passengers, for a time sufficient to receive and let off passengers, railroad company which receives a passenger on board a mixed train, and collects his fare, is obliged to transport him safely, and stop the train at the station to which he has paid his fare.<sup>5</sup>

The Supreme Court of Missouri rules that, in an action for compelling a passenger to get off the train before reaching destination, on the ground that the train did not stop there, proof that it sometimes stopped at that station is sufficient to show a wrongful ejectment, and to put the burden on defendant to show that such stops were exceptional and under special instructions.<sup>6</sup>

In Missouri the Supreme Court rules that though a conductor was guilty of a wrong in compelling a girl of 16 to get off the train before reaching her destination, a rape committed on her by a male passenger, who also got off at the station at which she was compelled to alight, is not the direct and immediate consequence of defendant's wrongful act, where such station was not an inappropriate or unsafe place for a youthful and inexperienced female traveling alone to remain between trains.<sup>7</sup>

In Texas the Supreme Court holds that a passenger who takes off his coat and places it on an unoccupied seat is not guilty of such contributory negligence as will prevent his recovering for money therein contained, lost by the overturning of the coach into the water.<sup>8</sup>

In the same state the same court rules that where a passenger contracted for a ticket over the route he was traveling on when removed from that train, but his mistake was given a ticket over a different route when the mistake was discovered the company was not justified in treating the passenger as a trespasser and refusing him the right to continue his journey by that train, but should have given him a reasonable opportunity, when the train stopped to purchase other tickets. The passenger had the right to stand on his contract with the ticket agent, and if he was not furnished with a ticket evidencing his rights secured by the contract entered into, the company should have corrected the mistake, and was liable for ejecting him from the train.<sup>9</sup>

The Supreme Court of Missouri holds that a railroad track repairer and a locomotive engineer in the employ of the same company are not fellow-servants within the rule exempting masters from liability for injuries to a servant sustained through the negligence of a fellow-servant.<sup>10</sup>

In Pennsylvania it appeared that an order was telegraphed to the conductor and engineer of the train on which deceased was a brakeman, giving them notice to keep out of the way of a certain train which was following them. The conductor, one of plaintiff's witnesses, testified that it was the usual custom to signal trains approaching from behind, at the place where the accident in question happened, by going back on the track and placing caps on the rails; that deceased was about to do this, but waited a few moments to fix his fires first, and in that time the collision occurred. The Supreme Court decides that the duty of avoiding a collision rested on the men in charge of deceased's train, and there could be no recovery; for, if deceased ought, as brakeman, to have put caps on the rails as a signal, and failed to do so, the collision was the result of his own negligence, and, if the conductor or engineer failed to sidetrack the train or give proper signals, the collision was the result of the negligence of deceased's co-employees.<sup>11</sup>

In Alabama, in an action for injuries received by a brakeman by a defective brake rod, it appeared that the defect could not be detected by an ordinary inspection. The Court rules that it was not the company's duty to remove the brake rods and examine them for hidden defects, except in cases of an emergency which would suggest to a reasonably prudent person a necessity for such inspection.<sup>12</sup>

In Kentucky it is held by the Court of Appeals that a railroad is not liable for an injury received by a brakeman, from a defect in a drawhead, while uncoupling a car under the orders of his conductor, who knew of the defect, if the brakeman also knew of the defect, or, by the exercise of ordinary diligence, could have discovered it, and avoided the injury, though the conductor was negligent in failing to inform him thereof before he ordered him to uncouple the car.<sup>13</sup>

In Texas it is held that where a person was killed while in a wagon crossing a railroad track, negligence on the part of the driver of the wagon is imputable to deceased, who was blind, and unable to take care of himself, and who, of his own volition, confided himself to the care of such driver, his father.<sup>14</sup>

In the same state it is ruled that it is the duty of a railroad to adopt well-tried inventions for the protection of persons lawfully on its track at highway crossings; and, if decedent's death was caused by ordinary negligence of the company in permitting the use of a hand car not supplied with the most efficient brakes, the company is liable for his death, if such negligence was the approximate cause of his death, and he was not guilty of contributory negligence.<sup>15</sup>

In Indiana the Supreme Court holds that it is proper to charge that the jury must determine from all the circumstances whether the rate of speed of the train at the crossing was unreasonably high; that a very high rate of speed might be allowable in a thinly-settled part of the country, where but few persons have occasion to cross the track, while the same rate of speed through a city or village, where many persons have occasion to cross the track, might be so dangerous as to constitute negligence.<sup>16</sup>

<sup>1</sup> Baughman v. L. E. & St. L. 21 S. W. Rep. 757.

<sup>2</sup> Zimmer v. N. Y. C. & H. R. 33 N. E. Rep. 642.

<sup>3</sup> South. Pac. v. Haas, 21 S. W. Rep. 1021.

<sup>4</sup> N. & W. v. Sutherland, 17 S. E. Rep. 127.

<sup>5</sup> Thomas v. C. C. & A. 17 S. E. Rep. 226.

<sup>6</sup> Sirs v. Wabash Ry., 21 S. W. Rep. 903.

<sup>7</sup> Sirs v. Wabash R. Co., 21 S. W. Rep. 905.

<sup>8</sup> Bonner v. Grumbach, 21 S. W. Rep. 1010.

<sup>9</sup> Gulf, C. & S. F. v. Rather, 21 S. W. Rep. 951.

<sup>10</sup> Schlereth v. Mo Pac., 21 S. W. Rep. 1110.

<sup>11</sup> Hoover v. Beech Creek, 26 Atl. Rep. 315.

<sup>12</sup> L. & N. v. Campbell, 12 South Rep. 574.

<sup>13</sup> L. & N. v. Law, 21 S. W. Rep. 648.

<sup>14</sup> Johnson v. Gulf, C. & S. F., 21 S. W. Rep. 274.

<sup>15</sup> Johnson v. Gulf, C. & S. F., 21 S. W. Rep. 274.

<sup>16</sup> C. St. L. & P. v. Spilker, 33 N. E. Rep. 280.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends:

Dividends on the capital stocks of railroad companies have been declared as follows:

Pittsburgh, Cincinnati, Chicago & St. Louis, semi-annual, 2 per cent. on the preferred stock, payable Nov. 15.

Rome, Watertown & Ogdensburg, quarterly, 1½ per cent., payable Nov. 15.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Alabama & Vicksburg, annual, Jackson, Miss., Nov. 6.

Baltimore & Ohio, annual, Baltimore, Md., Nov. 20.

Buffalo, Rochester & Pittsburgh, annual, New York City, Nov. 20.

Grand River Valley, annual, Jackson, Mich., Jan. 10, 1891.

Louisville & Nashville, special, Louisville, Ky., Nov. 8, to vote on an increase of the stock to \$80,000,000.

Manhattan Elevated, annual, New York City, Nov. 8.

New York, Lake Erie & Western, annual, New York City, Nov. 28.

New York & Northern, annual, New York City, Nov. 8.

Philadelphia, Germantown & Norristown, annual, Philadelphia, Pa., Nov. 6.

Spokane Falls & Northern, annual, Spokane, Wash., Nov. 13.

##### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Central Railway Club will meet at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of November.

The Western Railway Club meets in the rooms of the Central Traffic Association, Monadnock Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The New York Railroad Club meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 7:30 p. m.

The Northwest Railroad Club meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, except June, July and August, at 8 p. m.

The American Society of Civil Engineers meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month.

The Canadian Society of Civil Engineers meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday.

The Technical Society of the Pacific Coast meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The Tacoma Society of Civil Engineers meets in its rooms, 201 Washington Building, Tacoma, Wash., on the third Friday in each month.

The Association of Engineers of Virginia holds informal meetings the third Wednesday of each month, from September to May, inclusive, at 719 Terry Building, Roanoke, at 8 p. m.

The Boston Society of Civil Engineers meets at Wesleyan Hall, Bromfield street, Boston, on the third Wednesday in each month, at 7:30 p. m.

The Western Society of Engineers meets at 78 La Salle street, Chicago, on the first Wednesday in each month, at 8 p. m.

The Engineers' Club of St. Louis meets in the Odd Fellows' Building, corner Ninth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The Engineers' Society of Western Pennsylvania meets at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The Civil Engineers' Club of Cleveland meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The Engineers' Club of Cincinnati meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month at 8 p. m.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the South meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The Denver Society of Civil Engineers meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The Montana Society of Civil Engineers meets at Helena, Mont., on the third Saturday in each month, at 7:30 p. m.

The Engineers' Club of Minneapolis meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

##### American Society of Civil Engineers.

At the meeting of Wednesday evening, Nov. 1, the paper was on the subject of "Protecting Pilots Against the Attacks of the Toledo Navalists on the Louisville & Nashville Company's Lines," by R. Montfort, M. Am. Soc. C. E.

At the meeting to be held on the evening of Nov. 15, the paper to be presented will be on "The Tower of the New City Hall at Philadelphia, Pa.," by C. R. Grimm, M. Am. Soc. C. E.

The writer states that it has long been the practice to construct domes, conical roofs, etc., supported by a number of trusses occupying planes radial to the vertical axis of the structure. J. W. Schwedler conceived the idea of designing the wrought-iron "mantle construction" which bears his name, in which the stresses occur and are taken up in the mantle of the structure, leaving all the interior space clear. The literature upon this subject is as yet scanty, and since the iron-work of the new City Hall at Philadelphia is of this kind, the writer desires to give an account of it to the Society.

Up to a height of 337 ft. the tower is of brick, faced with marble, and is now about complete. To avoid excessive pressure upon the foundation, the commission decided to construct the remaining portion, 173 ft. in height, of metal. The contract was awarded to the Tacony Iron & Metal Company, Tacony, Pa., the author being placed in charge of the designing.

The framework rests upon granite blocks and consists of an octagonal prism, surmounted by an octagonal pyramid of the same diameter. This wrought iron framework may be divided into a primary and secondary construction, the former being the true skeleton, while the latter forms the direct support of the shell and transmits to the former the wind pressure upon it, and, in the case of the pyramid, its weight also. The weight of the shell of the prismatic portion is carried by the secondary construction directly to the masonry of the tower. The inside diameter of the octagon is 49 ft., outside diameter 53 ft., inside diameter of the octagon at the top of the pyramid is 4 ft. 6 in., and the outside diameter 4 ft. 10 $\frac{1}{2}$  in. The height from the top of the granite to the connection with the prism and pyramid is 67 ft., and from the latter point to the top of the tower cap 104 ft., which latter will receive the colossal bronze statue of William Penn, 37 ft. in height; making a total height, from the ground to the top of the statue, of 547 ft. 7 $\frac{1}{2}$  in.

The primary construction is divided into 10 stories, three for the prism and seven for the pyramid, and consists of eight rafters forming the corners of the prism and eight columns forming those of the pyramid, together with the octagonal braced rings and the diagonals. A panel is comprised between two rafter sections of the pyramid (or two column sections of the prism), and two ring-sections, one above the other, and each is crossed by two diagonals, designed for tension, those for the top stories being for compression also.

The eight columns of the prism rest upon four wrought iron box girders, 24 ft. 4 in. long. The girders rest lengthwise upon cast iron wall plates, 3 ft. x 11 ft. x 2 $\frac{1}{2}$  in. The box girders project, therefore, 6 ft. 8 in. at each end, forming cantilevers of this length. The columns of the prisms are supported by these projecting arms, 4 ft. 8 in. from the ends of the wall plates. This peculiar construction is made necessary by the character of the supporting masonry.

The wind bracings consist of two sets of horizontal tension members, acting with the compression members, which form the octagonal ring at the top of each story. Since the feet of the columns in the prism are anchored to the box girders, the wind bracing is not there required. This horizontal construction allows only such deformations as are due to the elasticity of the material. This form of bracing was required by the necessity of a spiral staircase within the tower, reaching from the top of the stone tower up to the balcony.

The secondary construction consists of four skeleton columns 56 ft. 9 in. high, and four arches about 36 ft. 3 in. span, together with three octagonal rings and 76 vertical posts between them.

The secondary construction of the pyramid consists of octagonal rings which support the jack rafters.

All floors are carried by the tower framework, the first at the top of the prism, the second at the middle of the sixth story, the third at the top of the seventh story, from which latter a door leads to the balcony. The weight of the prism shell is carried to the masonry independently of the primary construction; its wind stresses are carried to that construction by horizontal rigid connections.

All rafters of the pyramid and all columns of the prism have two web plates and four angles, and only in the case of the bottom column has a cover plate been added. The tier-rods of the wind bracing are pin-connected. The diagonals are pin-connected to the struts. All tension members are connected by either clevises or single eyes with open turnbuckles. The main and lateral pins are of steel. The aim has been to design all details centrally, and when a bending moment is thrown on a member in addition to the stress due to its position as a member of the structure such member has been proportioned to resist both.

#### Engineers' Society of Western Pennsylvania.

The regular meeting of the Society was held on Oct. 17, at 8 p.m. In the absence of the President, Mr. Thomas H. Johnson was in the chair. Mr. G. Kaufman read a paper on "Natural Filtration for Domestic Water Supply." A paper from Mr. S. M. Wickersham, "To Extinguish Oil Fires," was, in his absence, read by Mr. Thomas P. Roberts. Both papers were fully discussed.

At the meeting of the Chemical Section on Oct. 24 an address was made by Dr. Chas. B. Dudley, chemist Pennsylvania Railroad Company, on "The Necessity for Standard Methods of Analysis of Iron and Steel." A brief abstract follows: When reputable chemists analyze identical samples with pure chemicals and disagree, the fault must be one of method. The adoption of standard methods would enable competent chemists to obtain strictly comparable results. Such methods would be revised when necessary, but should be regularly used until so revised. The work of the "Committee on International Standards for the Analysis of Iron and Steel" will produce valuable results. Their standards, however, will not be a check on difference of methods of analysis. A method of analysis may have reciprocating errors and give correct results on samples of one certain composition only. A chemist using such a method might agree with the standard sample and be wrong on all samples of different composition. A further shortcoming of standard samples as checks on methods of analysis is found in the following consideration: Unless the standard contains carbon, etc., in exactly the same state of combination in the steel, in which it exists in all other samples analyzed by same method, it is not a check on the correctness of the method.

#### Place of Meeting for the Technical Conventions.

The joint committee of the two associations have decided on Saratoga, N. Y., as the place for the next convention. Mr. R. C. Blackall issues the following notice: Having been appointed Chairman of the Committee of Arrangements by the two associations, with Mr. S. A. Crone, as a member from the Master Car-Builders' Association, and Mr. Thomas B. Purves, Jr., as a member from the Master Mechanics' Association, associate members, for the holding of the conventions at Saratoga in June, 1894, our committee have made arrangements with Mr. H. S. Clements, Manager of Congress Hall, as to terms, as follows: Single rooms, per day, \$3; double rooms, with two persons, each \$3; double room, with one person, \$4; room with bath, one person, \$5; room with bath, two persons, \$8; private parlor, \$8. These rates are to members of the associations and their friends. Applications for rooms should be made to H. S. Clements, Manager Congress Hall, Saratoga Springs, N. Y.

#### Northwest Railroad Club.

At the annual meeting held in St. Paul on Tuesday last, the following officers were elected: President, J. C. Barber, M. C. B., N. P. R. R.; Vice Presidents, E. A. Williams, M. M. M., St. P. & S. Ste. M. Ry. and George D. Brooke, M. M. St. P. & D. R. R.; Treasurer, J. O. Patter, S. M. P., Gt. Nor. Ry.; and Secretary, C. A. Seeley, M. E.

#### New England Railroad Club.

The regular meeting of the Club will be held at the United States Hotel, Boston, Wednesday, Nov. 8, at 7:30 p.m. The subject for discussion is Permanent Way and Rolling Stock, and Their Relation to Each Other," to be opened by James N. Lauder.

#### PERSONAL.

—Mr. James H. Hustis has been appointed Assistant Superintendent of the Harlem Division of the New York Central & Hudson River road.

—Mrs. E. O. McCormick, the wife of the Passenger Traffic Manager of the Cleveland, Cincinnati, Chicago & St. Louis Railroad, died at her home in Cincinnati, O., Oct. 25.

—Mr. Benjamin G. Briggs, for some time connected with the Philadelphia & Erie engineering department, has entered upon his new duties as Assistant City Engineer of Erie, Pa.

—Mr. Edward C. Hiser, formerly Master Mechanic of the Adirondack & St. Lawrence, at Herkimer, N. Y., has been appointed Master Mechanic of the New York Central & Hudson River road at Utica, N. Y.

—Mr. J. T. Odell, formerly General Manager of the Baltimore & Ohio Railroad, was elected Vice-President of the New York & New England road this week, in the place of Mr. F. H. Prince, of Boston, who resigned some months ago.

—Mr. James Meehan, Superintendent of Motive Power and Machinery of the Queen & Crescent system, has resigned, to take effect Nov. 1, and the office has been abolished. Mr. Meehan has been with the road for many years.

—Mr. W. J. Crosby, for five years the Assistant Division Superintendent of the Harlem Division of the New York, New Haven & Hartford Railroad, has resigned. His successor is Mr. Peter E. Bowman, Freight Agent of the New York Division.

—Mr. W. C. Farrington has been appointed General Manager of the Eastern Railway of Minnesota, with headquarters at Duluth, Minn. Mr. Farrington has been General Agent for the company at that point for several years, and the promotion is a merited one.

—Mr. W. D. Crozman and Mr. Willis C. Squire have resigned from the staff of the *Railway Age*. Mr. Squire has accepted the position of Western Agent of the Boston Railway Equipment Co., with his office at 425 Western Union Building, formerly the Phoenix Building, Chicago.

—Mr. Samuel Woodard has been appointed Master of Transportation of the Kentucky & Indiana Bridge Co., and will have entire charge of the traffic of the bridge under the direction of the Receivers. Mr. Woodard is a son of General Manager W. R. Woodard, who resigned last week.

—Mr. W. K. Richards, General Freight Agent of the Cleveland, Akron & Columbus, has resigned, and the office has been merged into the new position of Traffic Manager of the Cleveland, Akron & Columbus and Ohio Southern, to which Mr. S. Rush Brockenhough, late General Freight Agent of the Chicago & Eastern Illinois, has been appointed.

—Mr. F. M. Murphy, of Chicago, has been elected President of the Santa Fe, Prescott & Phoenix, which is building a road through Arizona south of the line of the Atchison, Topeka & Santa Fe. He succeeds Mr. D. B. Robinson, Vice-President of the Atchison, Topeka & Santa Fe, who has been President of the new road since its organization.

—Mr. Francis Collingwood, Secretary Am. Soc. C. E., is to deliver the first of the special series of addresses on engineering subjects for the students in the school of engineering at the University of the City of New York. The other lecturers will be Major Alfred F. Sears, Alfred W. Trotter, Edward Wegemann, Jr., Mr. W. F. Whittemore, Charles B. Brush and Alphonse Fteley.

—Major G. W. Vaughn was last week elected General Manager of the Santa Fe, Prescott & Phoenix Railroad, which is building a line of over 200 miles through New Mexico. The company has about 75 miles on the northern end of the line ready for operation. Major Vaughn has been Chief Engineer of the road during the entire period of construction, and he still retains the title of Chief Engineer, and is also Vice-President of the company.

—Mr. Samuel Little has been elected Director of the West End Street Railroad of Boston, which controls all the street car lines in that city, to succeed Mr. Henry M. Whitney, who resigned some time ago. Mr. Little has long been actively interested in street railroad properties and has been a Director of the West End Company since its organization. He is also President of the Boston Lead Co., the Bay State Gas Co., and a Director in many other corporations.

—Mr. Robert I. Sloan, who has been Chief Engineer of the Chicago & South Side Rapid Transit road in Chicago during its construction, has been appointed Chief Engineer of another of the new elevated lines in Chicago, the Lake Street Elevated, which has arranged to complete its structure on the west side of the city. Mr. Sloan was Chief Engineer of the Manhattan road in New York before his removal to Chicago in 1890, for about 10 years. He was Principal Assistant Engineer of the Metropolitan Elevated line in New York during its construction.

—Judge J. W. Lusk, of St. Paul, Minn., has resigned the position of General Solicitor of the Chicago Great Western to accept that of President of the German-American National Bank of that city. Judge Lusk has been connected with the company from the start and held the position of General Solicitor of the Minnesota & Northwestern. He retained the position when the properties were consolidated as the Chicago, St. Paul & Kansas City, and continued with the Chicago Great Western when it, in turn, succeeded the Chicago, St. Paul & Kansas City.

—Mr. Harry E. Felton, General Freight Agent of the Evansville & Terre Haute Railroad, has tendered his resignation. He will become General Freight Agent of

the Chicago & Eastern Illinois. In accepting this appointment Mr. Felton returns to the service of the company with which he had been connected for many years. In 1882 he became a clerk in the general freight office of the Chicago & Eastern Illinois, and by steady promotions rose to be Assistant General Freight Agent. He held this office when he went to the Evansville & Terre Haute in January last.

—Mr. C. P. Huntington, President of the Southern Pacific, will leave New York shortly for California, and expects to spend the winter in that state and give close attention to the affairs of the Southern Pacific Company. He has arranged to make one annual trip to California instead of two as has been his custom for some years past. Mr. Huntington has sold many of his Eastern railroad properties in the last few years, and it is understood that he will further consolidate his interests and give more time to the management of the Southern Pacific properties.

—Mr. Robert B. Campbell has been appointed General Manager of the Baltimore & Ohio Railroad, as successor to Mr. J. T. Odell, who resigned recently. Mr. Campbell has been General Superintendent of the Baltimore & Ohio lines west of the Ohio River for the last few years. He was for ten years Division Superintendent on the Chicago, Milwaukee & St. Paul, going to that road from the Central Pacific, on which he had been an Assistant Division Superintendent. When Mr. Campbell left the Chicago, Milwaukee & St. Paul in 1891 he went to the island of Jamaica, in the West Indies, as General Manager of the Jamaica Railroad for a year. He returned in 1892, and in August became General Superintendent of the Baltimore & Ohio Western lines.

#### ELECTIONS AND APPOINTMENTS.

*Atlanta & West Point.*—A. Rowland having resigned as Master Car Builder, the office has been consolidated with that of the Master Mechanic, and J. C. McCarthy, Master Mechanic, has assumed its duties.

*Atchison, Topeka & Santa Fe.*—The annual meeting was held at Topeka, Kan., on Oct. 26. The directors elected were George C. Magoun, J. W. Reinhart, Thomas Baring, John J. McCook, Alden Speare, George R. Peck, William Libbey, Robert Harris, C. K. Halliday, E. B. Purcell, L. Severy, George R. Nickerson, Cecil Baring and B. P. Kenney. J. W. Reinhart was re-elected President, D. B. Robinson, First Vice-President; Edward Wilder, Secretary and Treasurer; G. R. Peck, General Solicitor, and John J. McCook, General Counsel.

*Bellingham Bay & British Columbia.*—H. G. Barkley has been appointed Acting Auditor, vice S. W. Means, Auditor.

*Cleveland Belt & Terminal.*—Frederick Swift has been appointed Supervisor of this road, with office at Cleveland, O., vice H. A. Blood.

*Cleveland, Cincinnati, Chicago & St. Louis.*—The office of R. P. Buchanan, Assistant General Freight Agent, has been removed from Cincinnati, O., to Anderson, Ind. The office of Homer F. Cost, Assistant General Freight Agent, has been removed from Anderson, Ind., to Louisville, Ky.

At the annual meeting last week George Bliss, H. McK. Twombly and J. D. Layng, of New York, and W. P. Anderson, of Cincinnati, were re-elected directors, and John T. Dye, of Cincinnati, was elected to succeed S. J. Broadwell, deceased.

*Columbus, Shawnee & Hocking.*—The officers elected by the Board of Directors are: President, P. W. Huntington; Vice-President and General Manager, F. J. Picard; Treasurer, H. D. Turney; Secretary and General Solicitor, W. E. Guerin.

*Duluth, Missabe & Northern.*—A. D. Allibone has been elected Assistant Treasurer, with office at Duluth, Minn.

*Eastern of Minnesota.*—W. C. Farrington, formerly General Agent for the Company at Duluth, has been appointed General Manager with headquarters in the latter city.

*Kentucky & Indiana Bridge Co.*—The following are the officers of this company under the receivership: John MacLeod, F. W. Tracy, S. M. Felton, Receivers; John MacLeod, Resident Receiver; George McLeod, Superintendent; V. M. Monroe, Auditor; H. W. Heazlitt, Treasurer; W. B. Meek, General Agent in charge of freight and passenger business. General offices, Louisville, Ky.

*Louisville, Evansville & St. Louis.*—The directors of the company have elected D. J. Mackey, President; E. O. Hopkins, Vice-President and General Manager, and W. J. Lewis, Secretary and Treasurer.

*Milwaukee & Southern.*—J. W. Preston having resigned the office of General Manager and Treasurer, the office of General Manager has been abolished. J. F. Gray has been appointed Superintendent and Treasurer, with office at Miliken, Ga.

*Missouri, Kansas & Texas.*—John C. Telfer, formerly Assistant General Auditor, with office at St. Louis, has been appointed Auditor of the lines in Texas, with office at Denison, Tex., vice Heber Page, resigned.

*North Hudson County.*—At a meeting of the company held in Hoboken, N. J., on Oct. 26 Director H. J. Sonn resigned on account of ill health, and John C. Besson and John F. W. Mangels resigned as directors because they have disposed of the greater part of their stock. The vacancies were filled by the election of Allan L. McDermott, William C. Heppenheimer and Col. E. A. Stevens, of Hoboken.

*Northern Pacific.*—The headquarters of the Superintendent of Motive Power were removed from the general offices of the company in St. Paul to the Como Shops of the company on Oct. 30th. This was done in order to provide room for the engineering and purchasing departments of the road which have, for a year past been located in Chicago and are now returned to St. Paul.

*Omaha & St. Louis.*—J. D. Hunter having resigned, F. P. Boatman has been appointed Superintendent of Motive Power and Machinery, with office at Stanberry, Mo.

*Path Valley.*—The incorporators of this Pennsylvania corporation are as follows: David Gring, of Newport, Pa., President; H. H. Bechtel and B. M. Eby, of Newport, Pa.; W. H. Sponsler, of New Bloomfield, Pa.; Hance Campbell, of Doyleburg, Pa., and James W. Holliday, of Dry Run directors. The Board of Directors had its first meeting at New

Germantown, Pa., on Oct. 25, and J. H. Irwin, of New-  
port, Pa., was elected Treasurer, and Wilson Coons, of  
Dry Run, was elected Secretary.

**Santa Fe, Prescott & Phoenix.**—At a meeting of the Board of Directors, held at the offices of the company in Chicago on Oct. 1, F. M. Murphy was elected President, vice D. B. Robinson, resigned. The following list gives the names of the present directors of the company: D. M. Ferry, N. K. Fairbank, C. D. Arms, C. C. Bowen, W. C. Bashford, G. W. Vaughn, G. W. Kretzinger, E. M. Dickey and F. M. Murphy. E. M. Dickey is Secretary and Treasurer, with headquarters at Chicago. Major G. W. Vaughn has been elected General Manager.

**St. Louis Southwestern.**—At a meeting of the company held in New York last week all of the old officers were re-elected, including S. W. Fordyce, President; Edwin Gould, Vice-President, J. C. Otteson, Secretary, and St. B. Doddridge, General Manager.

**St. Louis & San Francisco.**—The annual meeting was held in St. Louis, Mo., Oct. 24, and directors elected as follows: John T. Davis, George J. Gould, Alva Mansur, Alden Spear, Thomas Baring, E. C. Simmons, John J. McCook, George C. McGoun, Cecil Baring, William Libbey, Russell Sage, J. W. Reinhardt and Robert Harris. Mr. Harris was elected to succeed Allen Manvel, deceased.

**Texas, Sabine Valley & Northwestern.**—The annual meeting was held on Oct. 21 at Longview, Tex. The following directors were elected: Richard J. Evans, R. B. Levy, Jr., J. M. Mobberly, G. J. Merrill and W. F. Nelson, all of Longview, Tex.; Wilbur F. Herbert, Jr., Austin Gallagher, E. S. Larchar and F. M. Larchar, of New York City. The following are the officers of the company: E. S. Larchar, President; R. J. Evans, Vice-President and General Manager; W. F. Herbert, Vice-President, Secretary and Treasurer. The general office is at Longview, Tex., and the financial office at 8 Wall street, New York.

**Union Pacific.**—Alexander Millar, Secretary of the company, has been appointed Assistant Comptroller and Secretary to the Receivers. T. M. Orr has been appointed Assistant Secretary to the Receivers, with office at Omaha, Kan.

**Western Maryland.**—At the recent annual meeting John M. Hood was re-elected President and General Manager and George H. Baer was re-elected Secretary and Treasurer.

**Wisconsin & Michigan.**—The incorporators are John Bagley and Thomas J. Phelan, of Chicago; Benjamin Brown and Edward Daniel, of Menominee, Mich., and John A. Van Cleve, of Marinette, Wis.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Altoona & Philipsburg.**—The long-awaited decision of Judge Krebs on the track crossings of the Tyrone & Clearfield and its branches by this line, has been given and allows the crossings to be made at grade with a single exception. The road will be in operation between Philipsburg and Osceola, Pa., as soon as the crossings are made, and in about two weeks will be in operation as far as Houtzdale. Work will be continued on the road until a junction is made with the Altoona, Clearfield & Northern Railway, at Dougherty's mines, 12 miles east of Altoona. Mr. S. P. Langdon, of Philadelphia, is President of that road, and also of this company.

**Boston & Nova Scotia Coal Company.**—It is stated that the negotiations between the Nova Scotia Provincial Government and this company, respecting the construction of a line of railroad from Orangedale to the Broad Cove coal mines, have been completed. The contract for constructing the railroad has been let by the company to Messrs. Garson, Purser & Co., of St. Catharines, Ont., as already noted. The road is to be 33 miles long, from Orangedale Station on the Intercolonial road, to the Broad Cove coal mines. C. M. Odell, of Mabou, Nova Scotia, is Chief Engineer. The executive office is at No. 66 State street, Boston.

**Canadian Pacific.**—The corps of surveyors now engaged on the Crow's Nest Pass line are making the most of the remainder of the season. One part is masking levels and the other is running the line down the Moyea. Unless some change is made in the present programme, it is thought that the road will be built down the Moyea and across on the divide between that stream and the head of Goat River, and thence down the Kootenay on the south side of the Goat River.

**Central of Pennsylvania.**—But three miles of the 27 miles of track between Bellefonte and Mill Hall, Pa., remain to be put down. All the bridges have been practically completed. The rolling stock has been purchased and will soon be on the ground. Three passenger trips will be made over the new line daily at first and two freight trips. The roundhouse will be located near Bellefonte. The line will connect at Mill Hall with the Reading and Beech Creek roads. J. W. Gephart, of Bellefonte, is General Superintendent.

**Choctaw & Chickasaw National.**—Articles of incorporation have been filed in Arkansas with a capital stock of \$100,000. The charter provides for building one mile of road from the Choctaw Reservation line at Fort Smith at the junction of the Poteau and Arkansas rivers through the town of Fort Smith. Its incorporators are: E. V. Wright, James Brizzolari, W. H. Clayton, R. E. Dubois and G. E. Rider, of Fort Smith, Ark., Newton B. Childs, of Kansas City and Allen Wright, of Atoka, I. T.

**Chippewa River & Menomonie.**—This road is now completed and in operation to a point about three miles above Deer Lake, in Sawyer County, Wis. About 26 miles of main line altogether is now in operation north of the line of the Minneapolis, St. Paul & Sault Ste. Marie, the junction with which is made at Vernona Junction, near the Chippewa River, and east of the Weyerhaeuser Station. The line has been surveyed beyond Deer Lake toward Hayward, and it is expected to extend the road through to that town, about 25 miles, next summer. The road is built mainly to reach timber lands, and the President of the company is F. Weyerhaeuser, of St. Paul, a well-known timber merchant. D. R. Moon, of Eau Claire, Wis., is General Manager, and N. Mills, of Vernona Junction, Wis., is Superintendent.

**Duluth, Missabe & Northern.**—The Superior Mine branch of this road was completed to the new town of Hibbing, Minn., on Oct. 24, and has been turned over to the operating department. The company has until Nov. 1 to complete the branch to earn the subsidy of

\$250,000 voted some months ago by St. Louis County. The line is 17 miles long and extends nearly west from Ore Junction on the main line of the road to Superior Mine or Hibbing. The grading, which was done by Wolff & King, of Duluth, is not very heavy, but nearly 1,000,000 ft. of trestling was required. The road now has some 130 miles of track. It is handling about 7,000 tons of freight daily.

The road is building a terminal yard with 36 tracks for holding 2,000 cars. The road is now handling as high as 10,000 cars daily.

**Duluth & Iron Range.**—This road has 200 men at work building a four-mile extension northeast from Ely, Minn., to a new saw mill. For 3½ miles the extension follows the line surveyed to a connection at the International boundary with the Port Arthur, Duluth & Western road.

**Kansas City, Oklahoma & Pacific.**—The charter filed in Kansas gives a route of over 600 miles for this road, beginning near Coffeyville, in Montgomery County, Kan., and extending southwest to the south line of the state; thence through the Indian Territory and through Texas west to Albuquerque, N. M. The directors named are: R. B. Field, F. M. Roswell, W. T. Shaw and William E. McGinnis, of El Dorado, Kan., John B. Glaze and William Holes, of Emporia, and H. T. McKinney, of Albuquerque.

**Lake Superior Lumbering Co.**—This company has 300 men at work building a standard gauge road from St. Croix Lake, Wis., to the Northern Pacific crossing near Lake Superior. The road is for use, primarily, to get out 300,000,000 ft. of logs belonging to the Weyerhaeuser syndicate and haul them to Lake St. Croix.

**La Porte, Houston & Northern.**—J. F. Allen, who has the contract for building this road between Houston and Trinity Bay, Tex., reports the rails now laid for about 11 miles to Pasadena, the second station from Harrisburg, a small town near Houston, where the new road begins. The balance of the 16 miles to La Porte, on Trinity Bay, will be built within the next two weeks. This is the main line of the road and the grading has been completed since 1892. No track was laid until September last. Some grading has been done on a short extension to Clear Creek to connect with another short Texas road, and that work may be completed before the track-laying now going on is suspended. The line is built through a rolling prairie country, with a grade of less than 20 ft. to the mile and maximum curves of 1 deg. The officers of the company are as follows: A. M. York, President; J. H. Tenant, Treasurer; T. W. Lee, General Manager; C. G. Woodbridge, Chief Engineer, the address of all being Houston, Tex.

**Minneapolis, St. Paul & Lake Superior.**—This road was chartered in the present year with Donald Grant, of Faribault, Minn., the well-known railroad contractor, as President, and during the year surveys have been completed from St. Paul and Minneapolis to Superior, Wis., over 137 miles. The officers now announce that the work will probably commence about Dec. 1 on clearing the right of way, and getting out ties and bridge timber. It is proposed to begin the actual work of grading in the spring, as early as practicable. The contracts for the grading were let during the summer to Samuel and D. W. Grant, of Faribault, Minn. F. H. Anson is Manager, with office at Minneapolis, and F. D. Woodbury, also of Minneapolis, is Chief Engineer.

**Mississippi & Leech Lake.**—The city of Little Falls and Morrison County, Minn., last week voted \$100,000 bonds to aid the construction of this road from Little Falls to or near St. Cloud. This will afford the lumber mills of the former city a competitive line and will enable them to reach much territory that is at present inaccessible. Connections will be made, in the first 30 miles of the road, with the Minneapolis, St. Paul & Sault Ste. Marie and the Great Northern. Engineers will be placed in the field at once and the line constructed as rapidly as may be. There is no lack of money to aid the enterprise and the Weyerhaeuser lumber syndicate, which is largely interested in the project, promises to see it placed in successful operation.

**Mississippi Valley.**—The projectors propose to build a railroad from the Merchants' bridge railroad in East St. Louis, around that town, and thence along the Mississippi River, to Cairo, Ill., the distance being about 150 miles. The road for part of the distance will be along a levee, which was built by Thomas N. Chase, President of the railroad company, the use of the levee for a railroad embankment having been granted to the company. The officers state that the actual work on the grading will begin next month. Thomas N. Chase, of 534 Collinsville avenue, East St. Louis, is President, and J. W. Killion is Secretary.

**Mobile & Ohio.**—An agreement for the building of the Montgomery, Tuscaloosa & St. Louis to Montgomery, Ala., has been closed and it has been arranged that when completed it is to be operated as the Montgomery extension by this company, which guarantees its bonds. The Montgomery, Tuscaloosa & St. Louis road is to issue bonds to the amount of \$3,500,000 for the purpose of building a line from Columbus, Miss., to Montgomery, Ala., where connections will be made with the Plant lines. The bonds will be guaranteed by the Mobile & Ohio, and that company will operate the road. The line, with some branches, will be about 200 miles long, and will cross the Cahaba and Black Warrior cañons, among the richest in the South. Arrangements have been made for the sale of the bonds, and work on the line will begin as soon as proceeds of the bonds are available. The contract for building the road has been let to J. W. Woolfolk, 38 Wall street, New York City.

**Montreal & Occidental.**—The formal opening of a newly constructed portion of the line took place this week. This railroad starts at St. Jerome, Que., 33 miles from Montreal, and is now built as far as Chute aux Iroquois, a distance of 68 miles. It is intended to continue the road onward across the Gatineau River, about 60 miles distant. The road is operated by the Canadian Pacific under a five-years lease, by the terms of which that company may purchase the road when the lease expires.

**New Roads.**—A short line is being built by J. V. Rose, of the Sharon Fire Brick Works, to connect with the Lake Shore & Michigan Southern and New York, Pennsylvania & Ohio lines. It extends from a point 1½ miles below Sharon, Pa., to near Brookfield, O.

**New York & New England.**—The directors at a meeting in Boston this week authorized President Mc-

Leod to make traffic contracts with the New York, New England & Northern, and contracts for the construction of a line between Mill Plain, near the New York state line, and New York City. He was also authorized to make an agreement with the Manhattan Railroad Company for an entrance into New York City for the New York, New England & Northern. It is said that the Ryan & McDonald Construction Co., of Baltimore, has the contract to build the new road and turn it over completed to the stockholders of the New York, New England & Northern. Fifty-one per cent. of the stock of the new company is to pass to the treasury of the New York & New England Railroad, and the Ryan & McDonald Construction Company is to furnish all the money to build and equip the road.

**Nova Scotia Southern.**—R. G. Hervey, promoter of this road, says his company proposes to connect the towns of Shelburne, Liverpool and Caledonia, N. S., with the provincial railroad system and that the company has entered into a contract with the New York Contract Co., composed of New York and English capitalists, for the construction of the line. The contract is for the construction and equipment of the 76½ miles of road from Shelburne to New Germany, where connection is to be made with the Nova Scotia Central, and the work is to be completed before Dec. 31, 1894, and also to construct and equip, providing the provincial subsidy is obtained, 1½ miles from Caledonia to Liverpool.

**Ohio River & Charleston.**—This is the name under which the divisions of the Charleston, Cincinnati & Chicago, in North and South Carolina and in Tennessee, are to be hereafter operated. This company was organized by the bondholders of the road, through the Reorganization Committee, which purchased the various sections at foreclosure sale. It is said that this committee has formulated a plan for the construction of a connecting line to close the gap between the present North Carolina and Tennessee sections. Mr. Samuel Hunt, who is now the Manager of the entire road, and is the representative of the Finance Company of Philadelphia, is reported to have made a statement that it was the intention of those who now control the property to complete this line as soon as possible. To do so, however, would require the construction of an extensive road nearly 60 miles long, through a very mountainous country and across the Blue Ridge Mountains.

**Pajaro Valley.**—Surveyors have commenced work on an extension of this road from Watsonville to Corralitos, Cal., a distance of seven miles. The line will pass through some fine fruit and sugar-beet land in the Pajaro Valley and will be an extension of the line operated between Watsonville and Salinas, and will be managed by the Western Beet Sugar Co.

**Path Valley.**—A charter was last week granted to this company in Pennsylvania to build a road from New Germantown, by way of Burns Valley and Doylestown to Dry Run, Franklin Co., Pa. The authorized capital of the company is \$90,000. The line is to be an extension of the Newport & Sherman's Valley road, which will build four miles from Blain, its present terminus, to New Germantown. The located line to Dry Run as run by C. M. Dechant, C. E. of the company, was adopted by the directors last week and a series of resolutions to effect the securing of the right of way not yet taken and looking to immediate grading of the road were adopted. The company began grading last week at New Germantown and will begin this week at Dry Run and operations will be pushed onward as rapidly as possible toward the summit of the mountain which divides Path and Sherman's valleys. It is expected that work to the mountain slope on both sides will be finished before freezing weather, and during the winter the balance of the grading as well as the short tunnel will be completed. A most practical and excellent route has been laid out between the two valleys, and the road when completed will afford easy access and communication between residents of the valleys. The Path Valley is a rich and fertile section some 30 miles in length by five in width, presenting every natural advantage. Its people are now compelled to go as far to reach railroad facilities as the people of New Germantown and vicinity were prior to the construction of the Newport & Sherman's Valley road. S. H. Gring, of Newport, had the contract for the grading. The officers of the Newport & Sherman's Valley road have been engaged in securing the subsidies for this extension for some time. It was decided to organize a separate company, some of the directors of the Newport & Sherman's Valley road and the others, local residents. David Gring, of Newport, Pa., is President.

**Pittsburgh, McKeesport & Youngstown.**—The construction work on the Utzett branch, suspended on Aug. 19, was resumed last week, with orders to the men to rush the work. It is expected that the rails will be laid from Utzett to Perryopolis, Pa., three miles, by Nov. 10. The branch will be five miles long, and opens up an extensive coal field.

**Saranac & Lake Placid.**—This road is to be operated during the winter months by the Chateaugay Railroad Company. The line was built this year from Lake Placid to Saranac, N. Y., in the Adirondack Mountains.

**Texas Midland.**—The plans for the long talked of Northern extension from Roberts, Tex., are assuming definite shape, and it seems likely that actual work will be started probably before January. Nothing definite can be decided until one of the three routes is chosen, and the decision of that question depends largely upon the value of the right of way. The company has 52 miles in operation from Garrett, in Ellis County, via Kaufman and Terrell, in Kaufman County, to Roberts, in Hunt County. The preliminary surveys from Roberts have been made on three different routes to a point about 12 miles southwest from Paris. The Western route is via Greenville and Fairlie, passing about six miles west of Cooper in Delta County. The Eastern route is surveyed via Lone Oak, in Hunt County, Black Jack Grove, in Hopkins County, and Cooper, in Delta County. The third route is surveyed on nearly dividing ground between the other two, and runs through the towns of Campbell and Commerce, both in Hunt County, and intersects the Eastern route at Cooper. The distance from Roberts to Paris, if Paris is made the terminal point, is, by the Eastern route, about 67 miles, by the Western route about 69 miles, and by the Central route about 65 miles. The work will be light on the entire route; the greatest cut or fill is about 14 ft. and very short; the yardage runs from 6,000 to 22,000 cu. yds. a mile. The maximum grade is 52.8 ft. a mile; maximum curves, 3 deg. The bridging is nearly all piling, with but little of it over eight feet above ground, but there will be an aggregate length of about five miles. The company will probably complete the road in time to move the next crop. The route that is adopted depends to some extent, as already stated, on the cost of the

right of way, local subsidies and other arrangements with the towns and property owners. The surveys for the extension have been made by Martin Duvall, the Chief Engineer. E. H. Green is President and General Manager, the chief office of the company being at Terrell, Tex.

**Williams Valley.**—So well has this short road done in a business sense since it was first operated that the directors are considering the question of extending it from Williamstown to Millersburg, Pa., via Berryburg and other small towns, a distance of about 19 miles. An effort to this end will be made early next year, it is said.

**Wilmington & Weldon.**—In June last contracts were let by this company for an extension to connect with the South Bound Railroad near Columbia, S. C., which was to afford a shorter route by connecting with that line and the Florida, Central & Peninsular to Savannah and other Southern points. The work has made very considerable progress and most of the grading is now reported to be completed. The line now building is 44 miles long from Remini, the terminus of the Manchester & Augusta, 20 miles from Sumter, S. C., south to the new town of Denmark on the South Bound road. The grading is not very heavy, but there is about 22,800 lineal feet of trestle work to be erected, the longest bridge being across the Santee River, near Remini, which will be 14,000 ft. long. The erection of the timber for the trestling has not yet begun.

#### GENERAL RAILROAD NEWS.

**Atchison, Topeka & Santa Fe.**—The following figures, showing some of the results of operations for the year to June 30 last, are from the statement prepared for the annual meeting held last week. The complete annual report has not been issued: Gross earnings, \$50,733,706; increase over previous year, \$3,386,480; net earning from railroad operations alone, \$16,065,538, or an increase of \$948,082 as compared with 1892. The average operated mileage was 9,345. The gross earnings per mile increased \$359.15 and the net earnings, \$100.41. Number of tons of freight carried one mile was 2,974,670,170, an increase of 303,399,220 tons over the previous year. The increase of freight earnings for the year was \$1,717,423, and the average haul of each ton of freight was increased 2.86 miles. The freight revenue per ton per mile shows a decrease of .07 of a cent, almost nominal. The total number of passengers carried one mile was 404,806,811, an increase of 73,310,896 passengers per mile over the previous year. Receipts from passengers increased during the year \$1,100,144, and the average distance traveled per passenger increased 4.61 miles.

**Chicago, Peoria & St. Louis.**—The Central Trust Company of New York, this week filed a bill in the United States Circuit Court at Springfield, Ill., to foreclose a mortgage for \$1,500,000 against the above company. The court ordered the case consolidated with that of the Mercantile Trust Company against the same defendant. The Central Trust Co. is trustee under the first consolidated mortgage for \$1,041,000, and the Metropolitan Trust Co. is trustee under the first mortgage for \$1,500,000. The road is operated as the Jacksonville Southeastern line.

**Duluth, Missabe & Northern.**—The Commissioners of St. Louis County have turned over to this company the \$250,000 in bonds voted in aid of the construction of the line last spring. The work to be done to earn the bonds has been completed and the State Board of Railroad and Warehouse Commissioners have inspected the road and issued their official certificate that it is properly constructed and equipped. It is reported in Duluth that the bonds have been sold in New York at par. Pending the completion of the line the bonds were held in escrow by the American Loan & Trust Co. The money received from these bonds will be sufficient to liquidate the company's floating debt and to secure the discharge of the liens filed against its property. When this is done there will not be any reason for pressing the application for a receiver for the company, and it is generally conceded that there was no good reason for applying for one. It is believed that the suit was brought solely for the purpose of embarrassing the company that it would not be able to complete the line and earn the bonds.

**Fort Worth & Denver City.**—President Morgan Jones and Superintendent John D. Moore have been appointed Receivers for the Fort Worth & Denver City, the Pan Handle and the Fort Worth & Denver Terminal Co., on the application of Union Pacific interests. The application states that the gross earnings of the Fort Worth & Denver City line, including the Pan Handle road, from Jan. 1 to Oct. 8, were \$1,110,497 compared with \$1,294,231 for the same time in the preceding year. The loss in revenue has been more than \$100,000 and for the year will exceed \$150,000. This, it is claimed, would result in judgments against the company and the protection of the court was therefore sought.

**New York, Lake Erie & Western.**—The Receivers have announced that the interest on the first lien six per cent. bonds, due on Nov. 1, amounting to \$75,000, will not be paid. Provision has been made for the November interest, due on the first extension 7's, the collateral trust 6's, the Chicago & Erie 5's and the New York, Lake Erie & Western Coal & Railway guaranteed 6's and income 6's.

**Northern Pacific Coast.**—It seems that a change in the control of this company has recently taken place and several of the present directors, including the President, W. Steele, have retired to give the new interest representation on the board. The controlling stock is now held by James B. Stetson, J. C. Coleman and A. C. De Guigne of San Francisco, all of whom are present directors, with A. Borel and the Scottish American Investment Co. James B. Stetson has been elected President. The new owners propose to make a number of improvements next year. New ferry-boats will be built to run between San Francisco and the terminus of the road at Sausalito on the north side of the entrance to the harbor and about six miles from the city. New ferry slips will be built and a new terminal station. New rolling stock will be purchased, a number of curves on the present line eliminated and other improvements made to the roadbed.

**Old Colony.**—It is stated that so far only about 40,000 shares of the stock of this road have been offered by the stockholders for conversion into the stock of the New York, New Haven & Hartford. It is thought that very little additional stock will be offered for exchange, most of the stockholders apparently preferring the certainty of receiving a seven per cent. dividend, which is guaranteed under the lease to the New York, New

Haven & Hartford, to taking the chances of a higher rate of dividend which might be declared on the stock of the latter company, although that stock has been paying 10 per cent. dividends for many years. The privilege of exchange is offered to the Old Colony stockholders on the basis of 10 shares of that stock for nine shares of the New York, New Haven & Hartford.

**Paducah, Tennessee & Alabama.**—The Tennessee Midland Railroad and the Paducah, Tennessee & Alabama are now in the hands of W. L. Huse, of St. Louis, and John Overton, Jr., of Memphis, as Joint Receivers. Bills have been filed in the United States courts at Paducah, Jackson and Memphis by the St. Louis Trust Co. as Trustee, and the order appointing Messrs. Overton and Huse Joint Receivers of the two properties was made by Circuit Judge Horace Lurton at Nashville. There will be no change in the operation of the two roads. Both Receivers are officers of the roads. Mr. Huse is President and Mr. Overton is a Vice President. The two roads are controlled in the same interest, and form a line from Paducah, Ky., to Memphis, Tenn., 230 miles.

**Pennsylvania.**—The statement of the business of all lines of the Pennsylvania east of Pittsburgh and Erie for September, 1893, as compared with the same month in 1892, shows a decrease in gross earnings of \$703,514, a decrease in expenses of \$598,110, and a decrease in net earnings of \$105,404. The nine months of 1893, as compared with the same period of 1892, show a decrease in gross earnings of \$294,804, an increase in expenses of \$110,119, and a decrease in net earnings of \$404,923. All lines west of Pittsburgh and Erie for September, 1893, as compared with the same month in 1892, show a decrease in gross earnings of \$411,627, a decrease in expenses of \$355,236, and a decrease in net earnings of \$56,391. The nine months of 1893, as compared with the same period of 1892, show a decrease in gross earnings of \$254,170, a decrease in expenses of \$30,774, and a decrease in net earnings of \$223,396.

**Philadelphia & Reading.**—The conditions under which Speyer & Co., the New York bankers, consented to extend the company's loan for \$2,500,000 after the firm had advertised that the collateral would be sold at auction, were made public last week when the Receivers filed a petition in the United States Circuit Court asking the court to ratify the redemption of \$1,029,000 collateral trust bonds, a part of which the Receivers want to use to extend the Speyer loan. The petition says: "Speyer & Co. have agreed to accept \$500,000 collateral trust bonds, and to renew the loan for three months, with the option of the company to obtain a further renewal of three months upon the deposit of \$250,000 additional collateral trust bonds." The Receivers also ask for authority to pledge \$477,000 collateral trust bonds so that outstanding notes of the Atlantic City Railroad Co., to the amount of \$795,968, which are indorsed by the Reading and secured by its collateral, can be exchanged for notes of the Philadelphia & Reading. The holders of the notes, the petition says, "have agreed to make the exchange provided they are secured by the pledges of additional collateral trust bonds to an amount sufficient to make their holding double the amount of their debt."

**San Gabriel Valley Rapid Transit.**—This road has formally passed into the hands of the Southern Pacific, the legal transfer having just been made. The road is 20 miles long, and extends from Los Angeles to Monrovia, Cal., with a branch to Pasadena. The Southern Pacific has been operating the road for some time. It was formerly operated by the Los Angeles Terminal Co.

**Tennessee Midland.**—W. L. Huse, of St. Louis, President of the company, and John Overton, of Memphis, Vice-President, have been appointed Joint Receivers of this road. They are also Receivers of the Paducah, Tennessee & Alabama, which is now operated in connection with this road.

#### TRAFFIC.

##### Traffic Notes.

The sailing ship "Reaper" arrived in New York, Oct. 22, in 124 days from Astoria, Or.

The Great Northern has put on a daily tourist sleeping car between St. Paul and Seattle, and the free colonist sleeping cars heretofore run several times a week will be taken off.

The Macon Telegraph reports that the Southern Railway and Steamship Association has been trying to allot the shipments of cotton from that city, on the different roads leading to the seaboard, according to percentages to be fixed by the Commissioner of the Association, but that the roads which are likely to lose will "kick out of the traces."

The California Railroad Commissioners have just approved a new local freight tariff and classification which the Southern Pacific has prepared to go into use Jan. 1 next. The new tariff makes a considerable reduction from the present local rates. One account says that the average reduction will be 10 per cent. Officers of the Southern Pacific say that eastbound through freight has been heavier than westbound over that road for a year and a half, and that now the eastward tonnage is twice as large as the westward. This road hopes to ship 500 carloads of apples east as far as Chicago this season. Large quantities of potatoes are now going from California to Texas.

We printed last week the rules of the Texas Car Service Association for collecting storage on cotton, both in cars and when stored in warehouses or yards. A similar announcement has been made at New Orleans, though the scale of rates is made on a slightly different basis. The free time is four days, and after that the charge for storage is as follows: Fifth and sixth days, 5 cents a bale; seventh to tenth day, inclusive, 10 cents a bale; eleventh to fifteenth day, inclusive, 20 cents a bale; sixteenth to twentieth day, inclusive, 25 cents a bale; twenty-first to thirtieth day, inclusive, 30 cents a bale. Among the other rules in the New Orleans agreement is one providing that shippers shall not mark more than 100 bales with the same mark, nor include more than one mark in one bill of lading. These rules are issued by the New Orleans Freight Traffic Association, and it appears that there have been similar rules in past years, but with a different allowance of free time. The New Orleans Car Service Association has just issued rules for the collection of storage, after Nov. 15, on all freight. Flour, provisions in barrels and perishable freight will be allowed five days free and other freight 48 hours free. Special rates are made for hay, sugar, rice and molasses, and on other goods the rate is one cent per 100 lbs. for the first ten days and 7½ mills for each additional 10 days, no charge to be made for less than five cents.

Traffic Manager Leeds, of the California Traffic Asso-

ciation, has addressed a letter to the Chicago Herald, in which, after referring to his official decapitation at the hands of the Western Traffic Association, concerning which he says he believes he was the victim of circumstance rather than of malice, and consequently bears no malice toward any of the roads, he states that he is simply the agent of the Association, which was created for a definite purpose prior to his appointment, and that he believes that there is more reason why the Association should expend a small sum of money in the way of a subsidy to sustain the ocean lines than that the trans-continental lines should pay a large one to neutralize them, as has been done for 15 years. He says, further, that there is no truth in the statement that contracts have been made which exclude his Association from competition across the isthmus, but on the contrary it has a contract which does exclude the Pacific Mail from that traffic for both the Eastern coast of the United States and Europe for California and all points north of Acapulco. He says, in conclusion, that with an original capital of \$200,000, which is not yet all expended, the Association has been able to inflict a loss of \$20,000,000 on the transcontinental lines, which he justifies on the ground that without determined effort on the part of California merchants they are at the mercy of these lines.

##### Chicago Traffic Matters.

CHICAGO, Ill., Nov. 1, 1893.

The Soo Line (Canadian Pacific) has given notice to its competitors that it will withhold for the present its proposed reduced passenger rates of \$50 from St. Paul to Portland, Ore., and \$65 to San Francisco, and will agree to withdraw all reduced rates, provided the other lines will agree to do the same from the Missouri River.

The Union Pacific has not yet signified its assent to the placing of westbound immigrant traffic in the hands of Chairman Caldwell, of the Western Passenger Association, for distribution among the lines. At present the outlook for the consummation of the proposed plan is not bright.

The Rock Island has forced the fighting on Texas rates by making sweeping reductions on nearly all commodities averaging 60 per cent. On account of these reductions, which have necessarily been met by the other lines, renewed efforts are being made to bring about a meeting and the adoption of the revised agreement of the Southwestern Traffic Association. Freight rates to southwestern territory are now on a non-paying basis, and the sooner an agreement is reached the sooner the lines may look for revenue out of this business.

Another effort is being made to bring about the adoption of a uniform classification, and at the last meeting of the committee it was voted to submit a proposition to make eight classes only. When the subject was taken up some two years ago difficulty was experienced with the Eastern lines who are using the official classification, and who say that the best way will be for the Western lines to bring their classifications into conformity with the official. The official recognizes six classes, while the Western classification provides for ten.

The Central Traffic lines have agreed to the establishment of passenger rates for the midwinter fair at San Francisco to be made up of 80 per cent. of double the established first class limited fares to Western gateways, plus the round-trip basing rates tendered by the Western lines—\$65.50 from Missouri River points, \$12 between St. Louis and Kansas City, and \$20 between Chicago and the Missouri River. Tickets are to be sold up to April 9, 1894, with return limit of April 30, 1894, with transit limit of 15 days in each direction east of California, and to be confined to routes and conditions applying to all-the-year-round tourist rates to Pacific Coast points.

The Wabash has made reductions on all its passenger rates averaging from \$2 to \$3 from Toledo, Detroit and intermediate points to St. Louis. The reductions will be met by other lines.

The Commercial Travelers' Association has addressed another appeal to the Western Passenger Association, urging the adoption of a 5,000-mile interchangeable ticket for commercial men. The lines are extremely reluctant to grant this request owing to the opportunity which will be afforded for manipulation and on account of the increased work which will be thrown upon the auditing departments without corresponding return.

Western Freight Association lines have passed the resolution customary at this season that they will absolutely maintain all rates after the close of navigation. However, as one of the traffic officials said the other day, this will not prevent each from keeping a close watch on the other.

It is reported from Omaha that the Union Pacific will withdraw from all local passenger agreements. One of the reasons assigned for this sudden action is that these local agreements cover, to a certain extent, the redemption of tickets sold in territory other than that covered by the local agreements, which puts the Union Pacific to a great disadvantage in meeting competition to and from North Pacific Coast points, traffic to which is seriously injured by cut rates made by the Northern trans-continental lines. Until a restoration of these rates can be effected, the Union Pacific does not feel that it should be obliged to protect or even recognize the war rates now prevailing.

(Other Chicago traffic news will be found on page 802.)

##### Lake Superior Freight Matters.

Iron ore shipments from Lake Superior for the year to date are: Marquette, 1,250,000 tons; Aslbad, 1,050,000 tons; Two Harbors, 834,000 tons; Duluth, 330,000 tons. Added to this, to get the total from the Lake Superior mines, is 1,500,000 to 2,000,000 tons from Escanaba. Shipments for the year will close in about two weeks. Last year the total was 9,047,000 tons. A very large portion of this year's business is in unsold ore, sent down on account of the abnormally low lake freight rates.

Receipts of coal by lake at the head of Lake Superior up to Oct. 1 were 1,505,000 tons, against 1,450,000 tons to the same date in 1892. Total receipts for the year will be not over 2,000,000 tons, or a trifle above 1892. Of these receipts about 80 per cent. is bituminous. Docks at Duluth and Superior now contain 1,200,000 tons of hard and soft coal, shipments to the west and south having scarcely begun. There are 14 coal docks at the two cities, with a total storage capacity of 1,850,000 tons, and able to handle twice that in a year.

Flour grinding at the head of Lake Superior is not far from 60,000 barrels a week, with eight mills running. Shipments of Duluth and Minneapolis flour last week were 2,000 barrels, and will be very large till the close of navigation. The daily capacity of the mills is 16,000 barrels. This leads any other flour centre in America, except Minneapolis. These mills, when running full, will annually grind more wheat than had ever been received on the Duluth Board of Trade up to two years ago.